



Draft

OU1 SUPPLEMENTAL REMEDIAL INVESTIGATION REPORT

Shieldalloy Metallurgical Corporation
Superfund Site
Newfield, New Jersey

Prepared by


TRC Engineers, Inc.
Philadelphia, PA

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EXECUTIVE SUMMARY

TRC signed an Administrative Order on Consent (AOC) with the United States Environmental Protection Agency (USEPA) for certain portions of the Shieldalloy Metallurgical Corporation (SMC) Superfund Site, located in Newfield, New Jersey (Site) on April 28, 2010. This AOC defines non-perchlorate groundwater contaminated from SMC operations as Operable Unit 1 (OU1) and requires that TRC complete certain Supplemental Remedial Investigations (RIs) at the Site. More specifically, this AOC requires that TRC conduct supplemental RI work as detailed in the “Phase II Supplemental Groundwater Investigation Work Plan” dated August 2008, and approved by the New Jersey Department of Environmental Protection (NJDEP) and USEPA on June 10, 2009. At the time of work plan preparation and approval, the NJDEP was the lead agency. Since the execution of the AOC, the USEPA has become the lead agency, and the AOC requires that deliverables be submitted to the USEPA.

TRC conducted a Supplemental Remedial Investigation for OU1 (hereafter referred to as the OU1 Supplemental RI). The NJDEP directed this work with the purpose of achieving delineation of the tip and “sides” of the plume. The primary contaminant of concern is chromium (Cr) and the secondary contaminant of concern is trichloroethene (TCE), a volatile organic compound (VOC). It was also required to install sentinel wells at a location below cleanup standards.

Another significant purpose of the OU1 Supplemental RI, determined since the AOC execution, was to confirm or deny whether non-SMC sources may be contributing to OU1 contamination in the vicinity of the Site.

This OU1 Supplemental RI was performed in accordance with the approved work plan and the “OU1 Supplemental Sampling Event Notification” letter dated September 1, 2010 (TRC, 2010a). This report summarizes the OU1 Supplemental RI activities and findings and satisfies certain reporting requirements of the AOC.

Background Information

The SMC facility is located primarily in the Borough of Newfield, Gloucester County, New Jersey and comprises 67.7 acres. The southwest corner of the manufacturing portion of the facility is located in the City of Vineland, Cumberland County, New Jersey. SMC also owns an additional 19.8 acres of farmland (the Farm Parcel) located approximately 2,000 feet southwest

(the downgradient groundwater flow direction) of the main facility, which was purchased for groundwater remediation.

SMC manufactured specialty metals at the Site from 1955 to approximately 2007. The Site is currently used as office space and is sublet as warehousing and construction equipment storage space. Farms, commercial fuel storage, and a municipal landfill border the Site to the north. Mixed-use parcels lie to the west (including the Fischer & Porter/Andrews Glass site, with known or suspected environmental contamination), across South West Boulevard. Woods and a mixed-use area border the Site to the east. Woods and residences border the Site to the south. Several areas surrounding the SMC Site have been identified as potential contamination sources.

Remedial investigations dating back to 1972 identified groundwater contamination at the Site with chromium as the primary contaminant of concern and TCE as the secondary contaminant of concern. Chromium entered the aquifer via former wastewater lagoons (since closed under regulatory oversight). Since 1979, a pump-and-treat groundwater remediation system has been in operation.

With the submittal of the RI Report in 1991, NJDEP determined that enough data existed to address the groundwater as a separate operable unit (identified now as OU1), and directed the preparation of a focused feasibility study (FFS) to evaluate remedial actions for ground water. The FFS for ground water remediation was completed by Shieldalloy in February 1994 and established the objectives of a ground water remedial action of OU1. USEPA issued a Record of Decision (ROD) for OU1 dated September 24, 1996 which selected ground water extraction, treatment and discharge (a pump and treat system) to addresses the principle threat posed by ground water contamination at OU1. The OU1 ROD groundwater pump-and-treat ground water system continues to operate.

OU1 Supplemental RI Activities

Extensive remedial investigative activities occurred prior to this OU1 Supplemental RI work. Overall, a network of over 60 permanent monitoring wells has been installed and studied for the Site. These wells have been extensively sampled, many since the 1970s. This OU1 Supplemental RI included multiple rounds of investigation, each building upon information learned from earlier rounds, as directed by the NJDEP.

This early delineation provided generally very good delineation of chromium. For example, there are multiple wells (at multiple depths) on the Farm Parcel downgradient of the Farm Parcel Pumping well with non-detect concentrations of chromium. The OU1 Supplemental RI generally focused on TCE downgradient of the Farm Parcel. To a lesser degree, better delineation of chromium somewhat east of the Farm Parcel was desired.

Generally, OU1 Supplemental RI activities included the installation and sampling of temporary wells and permanent wells. The temporary wells were sampled at multiple vertical intervals (so these locations are referred to as vertical profiling, or VP, points), and were used to learn about contamination conditions and to guide the locations and screen intervals of permanent wells. This OU1 Supplemental RI was conducted during phases in 2002, 2006, 2009, and 2010, and included the installation of a total of 25 vertical profiling points and nine permanent wells, including sentinel wells. At the conclusion of each phase, the NJDEP determined that additional delineation was required. Upon work plan approval, the following phase was performed and reported.

The installation and sampling of the vertical profile temporary points, and the installation of the permanent wells are described in detail in the report. Because each vertical profiling point has data at multiple depths, much data was gathered. This data is provided and is interpreted in the report to describe the conditions of the aquifer and contaminants of concern.

The delineation effort successfully identified well-defined limits of the chromium and TCE plumes, as evidenced by non-detect concentrations of these contaminants of concern in the “sentinel” wells.

TCE Downgradient of the Farm Parcel Pumping Well

Low levels (less than approximately 20 ppb, compared to a USEPA cleanup standard of 5 ppb) of TCE exist downgradient of the Farm Parcel pumping well. This OU1 Supplemental RI also studied these low-level TCE groundwater concentrations, including some fate analysis. The findings of these TCE studies indicate that TCE decreases along the plume centerline to a point of non-detect, that TCE concentrations are low and stable, and that monitored natural attenuation (MNA) of TCE is favorable. This area is protected by a well restriction area implemented by Vineland due to NJDEP findings of other sources, discussed below.

Non-SMC Source Investigation

The OU1 Supplemental RI sampling also identified the presence in the groundwater of a number of chlorinated VOCs (CVOCs), primarily tetrachloroethylene (PCE), not associated with the SMC facility. PCE is detected over one mile from SMC, in a very broad plume indicative of more regional sources.

In order to understand these detections, TRC reviewed NJDEP files for sites in the surrounding area. The NJDEP identified a number of potential sources of CVOCs in studies (identified as the “North Vineland Groundwater Contamination” study) that were conducted in the 1980s. The North Vineland Groundwater Contamination Area is generally defined as the areas west of South West Boulevard and south of Weymouth Road. The Vineland Car Wash, the location of two of the SMC pumping wells is located in this area, but is not considered a potential source. The NJDEP identified several known and multiple suspected potentially responsible parties relative to CVOC contribution.

Based on the information from the file reviews, and at USEPA direction, TRC performed additional sampling around the Car Wash (because we had access to the Car Wash). Sampling of TRC’s 2010 OU1 Supplemental RI wells in the North Vineland Contamination Area indicates that CVOCs from non-SMC sources continue to exist in area groundwater.

This OU1 Supplemental RI Report concludes that non-SMC sources contribute to CVOC’s in groundwater west of South West Boulevard and south of Weymouth Road.

Recommendations

Based on these findings, TRC recommends the following:

1. Site activities should focus on expediting OU1 remediation. Delineation of the chromium and TCE plumes is complete.
2. With respect to CVOC groundwater contamination, the government has already acknowledged the existence of other potentially responsible parties (and non-SMC contamination). Our investigations have demonstrated that the CVOC plume west of South West Boulevard and south of Weymouth is impacted by non-SMC CVOC contamination. TRC cannot be made liable for non-SMC contributions to OU1. The government may or may not choose to take steps against non-SMC PRPs.
3. MNA should be further considered for the TCE groundwater contamination downgradient of the Farm Parcel pumping well (RIW2). The TCE concentrations

downgradient of the Farm Parcel pumping well are low (generally less than 20 ppb), decrease along the plume centerline to non-detect, are stable, exhibit conditions generally favorable to MNA, exist in an area where public water is required by a well restriction area, and are likely the result of non-SMC contributions to the plume.

1.0 INTRODUCTION

TRC signed an Administrative Order on Consent (AOC) with the United States Environmental Protection Agency (USEPA) for portions of the Shieldalloy Metallurgical Corporation (SMC) Superfund Site, located in Newfield, New Jersey (Site) on April 28, 2010. This AOC defines non-perchlorate groundwater contaminated from SMC operations as Operable Unit 1 (OU1) and requires that TRC complete certain Supplemental Remedial Investigations (RIs) at the Site. More specifically, this AOC requires that TRC conduct supplemental RI work as detailed in the “Phase II Supplemental Groundwater Investigation Work Plan” dated August 2008, and approved by the New Jersey Department of Environmental Protection (NJDEP) on June 10, 2009. At the time of work plan preparation and approval, the NJDEP was the lead agency. Since the execution of the AOC, the USEPA has become the lead agency, and requires that deliverables be submitted to them.

TRC conducted a Supplemental Remedial Investigation for OU1 (hereafter referred to as the OU1 Supplemental RI). The main purpose of the OU1 Supplemental RI was to delineate the downgradient extents of chromium (Cr) and volatile organic compounds (VOCs), primarily trichloroethene (TCE), in groundwater and to install sentinel wells. Another significant purpose of the OU1 Supplemental RI was to confirm or deny whether non-SMC sources may be contributing to OU1 contamination in the vicinity of the Site.

Remediation of OU1 was prescribed under a Record of Decision (ROD) that was signed in September 1996 between the NJDEP and SMC which requires that a groundwater pump-and-treat system be operated to contain and treat OU1 contaminants. The AOC adopts this general requirement.

This report summarizes the OU1 Supplemental RI activities and findings and satisfies certain reporting requirements of the AOC.

This OU1 Supplemental RI was performed in accordance with the approved work plan and the “OU1 Supplemental Sampling Event Notification” letter dated September 1, 2010 (TRC, 2010a).

The OU1 Supplemental RI was conducted in accordance with the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act (SARA).

This Report is organized as follows:

- Section 1 presents introductory and administrative information;
- Section 2 discusses background information;
- Section 3 discusses the work of the OU1 Supplemental RI;
- Section 4 includes an evaluation and interpretation of the OU1 Supplemental RI findings; and
- Section 5 presents conclusions and recommendations.

Supportive tables, figures, and appendices are included.

2.0 BACKGROUND

2.1 Site Environmental History and Setting

The SMC facility, located at 35 South West Boulevard, is located primarily in the Borough of Newfield, Gloucester County, New Jersey and comprises 67.7 acres. The southwest corner of the manufacturing portion of the facility is located in the City of Vineland, Cumberland County, New Jersey. SMC also owns an additional 19.8 acres of farmland (the Farm Parcel) located approximately 2,000 feet southwest of the main facility, also in Vineland. This parcel was purchased to facilitate groundwater remediation. A site location map is provided in Figure 2-1.

Specialty glass manufacturing began at the Site in the early 1900's. SMC manufactured specialty metals at the Site from 1955 to approximately 2007. The Site is currently used as office space and is sublet as warehousing and construction equipment storage space. Farms, commercial fuel storage, and a municipal landfill border the Site to the north. Residential and industrial properties lie to the south and west (including a number of sites that are known or suspected sources of contamination, as discussed herein), across South West Boulevard. Woods and a mixed-use area border the Site to the east. Woods and residences border the Site to the south. Several areas surrounding the SMC Site have been identified as potential contamination sources.

Remedial investigations (started at the Site in 1972) identified chromium as the primary contaminant of concern in groundwater. The OU1 pump-and-treat system started operating at one well in 1979 in order to address the chromium in groundwater. The extraction well was switched from W8 to W9 (W9 is part of the current system) in 1983. Treated water was (and is currently) discharged into an on-site, unnamed tributary of the Hudson Branch stream, under a New Jersey Pollution Discharge Elimination System (NJPDES) permit.

In 1989, four extraction wells were added to the pump-and-treat system to better capture the downgradient chromium plume, including the following wells: Layne, RW6S and RW6D (the "car wash" wells on Weymouth Road); and RIW2 (at the Farm Parcel). Also in 1989, SMC expanded the treatment system to include an air stripper to address the TCE that also exists in the groundwater. The metals-treatment portion of the system was changed to the current electrochemical precipitation in 1991.

Currently, approximately sixty monitoring wells exist throughout and downgradient of the Site (Figure 2-2, and Figures 2-3/2-3A). Monthly groundwater sampling occurred since the 1980s. After execution of the AOC, groundwater monitoring is occurring semi-annually.

An RI was conducted by TRC at the Site between October 1990 and April 1991 (TRC, 1992). The purpose of the RI was to investigate the physical characteristics of the Site, as well as potential sources of contamination, determine the nature and extent of contamination and characterize potential health risks and environmental impacts.

In addition to the constituents already introduced above (chromium and TCE), vanadium, a by-product of the SMC manufacturing process, was identified in Site surface soils during the RI. Because vanadium was detected in a high number of soil samples, some historic groundwater samples collected at the Site also exhibited detectable concentrations of vanadium. Figures 2-4 and 2-5 depict vanadium concentration isopleths in the shallow aquifer from December 1990 and January 2010. As shown on the figures, the highest vanadium concentrations were detected during both timeframes in the groundwater collected from well SC-13S(R) which is located in the eastern portion of the Site. A comparison of the concentrations from January 2010 relative to those detected during the RI indicates a significant decrease in the concentration of vanadium in groundwater. It is noted that vanadium is not considered a primary contaminant of concern for OU1. Vanadium is discussed herein primarily because of its potential helpfulness in regards to the Field Sampling Plan for the supplemental soils investigation to be submitted shortly.

Subsequent to the RI, TRC completed additional groundwater investigations to more fully characterize hydrogeological conditions and groundwater quality in the vicinity of the Site in order to determine the downgradient and vertical extents of chromium and chlorinated VOCs. Results of the 2002 investigation are summarized in Section 2.3.5.

Supplemental OU1 groundwater investigations were conducted in 2006-2007. Results of the 2006-2007 investigation are detailed in Section 2.3.6.

Former wastewater treatment lagoons were the primary source of the chromium groundwater contamination. One original unlined lagoon was replaced with nine smaller lined lagoons. SMC closed the nine wastewater treatment lagoons under NJDEP oversight during several phases from 1995 to 1998. This work included the excavation and off-site disposal of over 1,000 tons of soil, and post-excavation confirmatory soil sampling (TRC, 1999).

The primary source of the TCE groundwater contamination was a former Manpro-Vibra Degreasing Unit which was operated at the facility from 1965 to 1967. The unit was used to remove dirt, fines and grease from the manufactured metals. The only degreasing compound used in the unit was TCE (ERT, 1988). This was confirmed by the fact that TCE and several of its breakdown by-products have been the only chlorinated VOCs that have been historically detected in on-site monitoring wells located downgradient of former manufacturing areas at the Site.

As discussed later in this report, current data indicate that the groundwater extraction system, including the extraction well, RIW2, at the Farm Parcel, effectively contains the leading edge of the chromium plume. Further, the groundwater extraction system effectively contains the majority of the TCE plume. One of the goals of the OU1 Supplemental RI activities was to verify the extent of low-level (i.e., single-digit parts per billion) TCE concentrations in groundwater. These supplemental RI activities also included the identification of potential contamination sources that surround the Site. Also, a study to evaluate the effectiveness of in-situ methods to expedite contaminant mass reduction is ongoing and will be summarized under separate cover.

2.2 Hydrogeologic Overview

The Cohansey Sand is the primary geologic formation of interest at the Site. The Cohansey Sand is a sandy unconsolidated formation extending from approximately 30 feet below ground surface (ftbgs) to 130 ftbgs. The upper 40 feet of the Cohansey (30 ftbgs to 70 ftbgs) is comprised of coarse sands and little silt. For purposes of this Site, this zone is referred to as the shallow zone. The lower 60 feet of the Cohansey (70 ftbgs to 130 ftbgs) is comprised of finer sands and some clay/silt lenses. For purposes of this Site, this zone is referred to as the deep zone (occasionally broken down into intermediate and deep zones, based on well screen depths). Discontinuous silt and clay lenses exist in the deep zone, but are not considered to substantially affect Site hydrogeology (TRC, 1994).

The Bridgeton Formation, consisting primarily of brown sand, is a layer that overlies the Cohansey and exists along the eastern half of the Site. The Kirkwood Formation, consisting of a 30-foot thick layer of gray silts and clays, underlies the Cohansey. The Kirkwood Formation acts as a hydraulically confining layer to the Cohansey.

Depth to groundwater at the Site ranges from approximately 4 feet (in the southern portion of the Site) to 16 feet (in the northern portion of the Site). Seasonal fluctuations of groundwater are a few feet. Groundwater flow direction (in the shallow, intermediate and deep Cohansey) is to the southwest, from the Site towards the Farm Parcel. The average linear groundwater flow velocity is approximately 2.9 ft/day. Most on-site well clusters exhibit a downward hydraulic gradient from the shallow Cohansey to the deep Cohansey, generally attributable to Site pumping.

Information in support of the establishment of a Classification Exception Area (CEA), which restricts groundwater use, was filed with the State of New Jersey for the Site and its downgradient areas in April 2001 (TRC, 2001). The City of Vineland has designated the area downgradient of the Site as a well restriction area, requiring mandatory connection to public water (see Figure 2-6). Public water is provided throughout the downgradient areas of the Site. The closest location of a public well is nearly 3,000 feet north of the Site (which is side-gradient of the Site). The nearest municipal supply well downgradient of the SMC facility is Vineland Well #10, located along Delsea Drive, northwest of Burnt Mill Pond. This well reportedly has not been used since October 2004. The Vineland Water Company currently uses Well #14, which is located several thousand feet to the northwest of Well #10. Both wells cannot operate at the same time due to pumping and system capacity limitations (B. Kennedy, Personal Communication, 2006).

2.3 Groundwater Contamination History

2.3.1 Chromium

The 2010 OU1 Optimization Study Report (TRC, 2010c) summarized that hexavalent chromium concentrations in Site pumping wells located on the SMC facility and the car wash pumping wells were approximately 30,000 parts per billion (ppb) in the 1980s and have reached asymptotic concentrations of approximately 1,000 ppb (asymptote reached over the past 10 years). The Farm Parcel pumping well experienced hexavalent chromium concentrations in the 1980s at almost 20,000 ppb, and have also reached asymptotic concentrations of approximately 1,000 ppb. Because the Cohansey Sand is a sandy aquifer with little organic content (therefore relatively less potential to adsorb contaminants to soils particles) and relatively high permeability, the expected areal shape of plumes would be long and narrow. The chromium

plume generally fits this expected shape. (One exception is an area of the plume south of the Site, near an area referred to as the Lacroce property, where a lobe of the chromium plume has extended from the Site in a southerly direction as opposed to a southwesterly direction, which is consistent with the groundwater flow direction).

2.3.2 TCE

The 2010 Optimization Study Report (TRC, 2010c) also summarized that TCE concentrations near the SMC facility pumping wells were approximately 100 ppb in the 1990s and are currently approximately 1 ppb to 5 ppb. Also, the TCE concentrations near the car wash pumping wells were approximately 100 ppb in the 1980s, went as low as 5 ppb (or less) from 2000-2005, and have increased somewhat to approximately 10 ppb in recent years.

The TCE plume fits the expected “long and narrow” shape near the Site. Further downgradient, the TCE plume widens considerably, which is unexpected. It is likely that this unexpected shape is indicative of non-Site sources of TCE.

Further, the horizontal “shape” of the TCE plume in the deep aquifer is broad. Based on the relatively homogeneous sands that make up the Cohansey formation, the plume would be expected to be long and narrow. It is also expected that the long and narrow shape would be maintained by the pumping wells in line with the groundwater flow path. However, as shown in Figures 2-4 through 2-6, the deep TCE plume is very broad and widens as distance increases from the SMC facility. As discussed in Sections 2.3.4, 3.3 and 4.5, additional source areas downgradient of the SMC facility are believed to be contributing to the plume. As shown in Figures 2-7 through 2-9, the chromium plume (shallow, intermediate and deep) from the SMC facility conform to the expected long and narrow shape.

2.3.3 PCE and other CVOCs

Tetrachloroethylene (PCE) has never been detected in wells on or near the SMC facility. Low levels of PCE (1 ppb) were historically (in 1990) detected in two Site shallow aquifer monitoring wells located at the upgradient SMC property boundary (upgradient wells) (see Figure 3-5). The New Jersey Ground Water Quality Standard (GWQS) for PCE is 0.4 ppb. The USEPA drinking water maximum contaminant level (MCL) for PCE is 5 ppb. Downgradient of the SMC facility, across South West Boulevard, a significant increase in PCE has been detected

in multiple wells (screened in each of the shallow, intermediate and deep zones of the Cohansey aquifer). The first significant uptick in PCE concentrations in the shallow aquifer is seen in wells located near the North Vineland Car Wash with a more significant PCE plume seen in the intermediate and deep aquifer in the vicinity of the Farm Parcel, then further downgradient of the Farm Parcel and southeast of the Site (see Figures 3-2, 4-5 and 4-6). As stated in Section 2.1, SMC used TCE, not PCE, in their manufacturing degreasing operations. This is validated by the Site's historical groundwater results. This PCE uptick, and the identification of multiple known/potential responsible parties in the North Vineland Groundwater Contamination Area (see Section 2.3.4) adds further evidence of non-SMC sources of chlorinated VOC (CVOC) contamination in the groundwater downgradient of the SMC facility.

It should also be noted that TCE is a daughter product of TCE degradation .

As discussed in Sections 2.3.5 and 2.3.6, PCE was detected in a vast area during the recent delineation efforts. This PCE plume is far wider and longer than the SMC-related TCE plume.

Also, 1,1,1-trichloroethane (1,1,1-TCA) and 1,1-dichloroethene (1,1-DCE) (a first order breakdown by-product of 1,1,1-TCA) were detected in the deepest interval of VP-3. Due to the fact that PCE and 1,1,1-TCA were not involved in the manufacturing activities at SMC and the proximity of these vertical profiling locations to other previously mentioned industrial facilities that have or are currently being investigated by the NJDEP due to CVOC contamination issues, the potential exists for the PCE, TCE, and 1,1,1-TCA contamination originating from a source area(s) upgradient of the Farm Parcel but downgradient of the SMC facility.

2.3.4 Non-SMC Source Identification

The NJDEP identified a number of potential sources of CVOCs in studies (identified as the "North Vineland Groundwater Contamination" study) that were conducted in the 1980s. TRC performed a review of NJDEP files and summarized the findings in Appendix A. According to NJDEP records, the following known sources of CVOCs were documented:

Site	Direction/Distance from SMC	Known PCE/TCE	Comments
Wheaton Industries / Galena Lead Crystal	Southwest/ 550 feet	<ul style="list-style-type: none"> 2,500 ppb PCE and 14,000 ppb TCE in septic tank sludge 7,000 ppb TCE in groundwater 	Glass production, cleaning and stamping; chrome plating Two septic systems Possible source of Cr ⁺⁶ to groundwater
Fischer & Porter/ Andrews Glass	West/100 feet	<ul style="list-style-type: none"> 730 ppb PCE and 160 ppb TCE in septic tank sludge 2,200 ppb PCE in groundwater 	Circuit board assembly and glassware manufacturing Four septic systems
Research Glass of New Jersey	West/100 feet	<ul style="list-style-type: none"> 177 ppb PCE in groundwater 	Glass manufacturing One septic system
Marshall Services	North/550 feet	<ul style="list-style-type: none"> “waste PCE” was reported to NJDEP 2.6 ppb PCE found in nearby residential well 	Tanker truck storage and hauling
Dauito’s Express/ Budget Truck Repair	Southwest/900 feet	<ul style="list-style-type: none"> Elevated level of TCE in on-site potable well 	Junk car recycling/auto repair Unspecified on-site remediation in 1992

These sites and several other potential off-site source areas in the vicinity of the Site are identified on Figure 2-10.

Although the NJDEP had found compelling data identifying several sites which had contaminated North Vineland groundwater with CVOCs, they had indicated that the “characterization of off-site impact attributable to the historic discharge at the Fischer & Porter site is considered technically impractical and a poor use of available [NJDEP] resources.” (see Attachment 14 of Appendix A). This statement clearly indicates that the NJDEP had identified non-SMC sources of groundwater contamination in the North Vineland area but did not have the funding to prosecute the cases.

2.3.5 2002 South and West Delineation Investigation

Based on NJDEP direction, TRC completed an off-site groundwater investigation in the areas of the Lacroce property and the western portion of the Farm Parcel during June 2002 in accordance with a NJDEP-approved work plan (TRC, 2000). The investigation was targeted to address several perceived data gaps concerning the presence of TCE and chromium the vicinity

of the Lacroce property, and the potential for other sources of TCE in the vicinity of the Farm Parcel. The investigation included vertical groundwater profiling at three locations (on the northeast, south and west side of the Lacroce property; see Figure 2-3) using a screened auger tool (SAT), Geoprobe[®] shallow groundwater sampling at the same three locations, the installation of two additional monitoring wells (wells SC30D and SC31D), and groundwater sampling (TRC, 2004).

Total chromium was detected via laboratory analysis of groundwater samples collected at two vertical profiling locations (VP-1 and VP-2) and at all three Geoprobe[®] sampling locations (GP-1, GP-2, and GP-3) at concentrations exceeding the clean-up goal and MCL of 100 ppb. At vertical profiling locations VP-1 and VP-2, the highest levels of total chromium were identified at the shallowest sampling intervals, where high turbidity was likely a contributing factor. (Note that some of the total chromium in the shallow sample from VP-1 may have also resulted from field cross contamination, as suggested by the field blank result). Similarly, high turbidity was likely a contributing factor in the Geoprobe[®] samples. Only one sampling location, VP-1 at 125 to 130 ftbgs, had relatively low turbidity and a total chromium concentration greater than 100 ppb. Hexavalent chromium was not detected in any of the laboratory-analyzed samples. TCE was detected at all three vertical profiling locations at levels exceeding the ROD-specified groundwater clean-up level (1 ppb). The highest reported level (130 ppb) was detected at the interval of 145-150 ftbgs in VP-3.

Deep monitoring well SC30D was co-located with VP-1 and was installed south of the SMC facility, within the City of Vineland's right-of-way on East Arbor Avenue. Monitoring well SC30D was sampled quarterly since July 2002 and has not historically exhibited levels of VOCs, with the exception of PCE, or total chromium above ground water action levels. Since July 2002, PCE, a solvent not historically used by SMC, has been sporadically detected in this well at concentrations ranging between non-detect and 1.3 ppb. Furthermore, Cr⁺⁶ has not been detected above the laboratory detection limit in SC30D during any sampling event. Total chromium has only been sporadically detected above the laboratory reporting limit at levels less than 10 ppb.

The NJDEP concluded that additional delineation work should be completed.

2.3.6 2006 - Additional South and West Delineation Investigation

The NJDEP directed that additional delineation work be performed in the areas south and west of the SMC facility. The scope of the 2006-2007 investigation was outlined in the NJDEP-approved Draft Final Supplemental Off-Site Ground Water Investigation Work Plan submitted in October 2006 (TRC, 2006). The supplemental investigation was conducted between November 28, 2006 and January 5, 2007. Results of the investigation were presented in TRC's Draft Ground Water Operable Unit 1 (OU1) Design Report in February 2007 (TRC, 2007).

A total of thirteen locations were selected for vertical groundwater profiling via the use of a SAT; eight locations were selected to delineate the plume in the vicinity of the Lacroce property, and five locations were selected hydraulically downgradient of the Farm Parcel. The final boring locations included the nine locations originally proposed in the work plan (VP-1 through VP-9), one "optional" location (VP-9A) noted in the work plan, and three additional locations which were added based on initial laboratory analytical results and selected after consultation with the NJDEP (VP-10 through VP-12). These locations are shown on Figure 2-3.

In addition, during the vertical groundwater profiling investigation, one sentinel monitoring well (SC32D) was installed on West Forest Grove Road approximately 10 feet east of the VP-5 location, following consultation with NJDEP personnel.

2.3.6.1 Laboratory Results

The vertical groundwater profile samples were analyzed for VOCs, total chromium, Cr^{+6} , nitrate, methane, and ferrous iron (Fe^{+2}) by Accutest Laboratories of Dayton, New Jersey, a New Jersey-certified laboratory. The monitoring well installed as part of this investigation (SC32D) was sampled in January 2007 for VOCs, total chromium, Cr^{+6} , sodium (Na), sulfate (SO_4) and Fe^{+2} . Concentrations of methane and Fe^{+2} were evaluated to assess the abundance of those natural attenuation parameters in the aquifer. The analytical results of all laboratory-submitted samples are summarized in the following sections and the concentrations of total chromium, Cr^{+6} , TCE and PCE are shown on Figure 2-11.

2.3.6.2 Metals

The vertical groundwater profile samples were submitted to the laboratory for total chromium and Cr^{+6} analyses in an effort to determine the horizontal and vertical extents of the

plumes. Total chromium concentrations were generally low, with only two vertical profiling locations exhibiting concentrations exceeding the groundwater clean-up standard specified in the September 1996 ROD of 100 ppb or the MCL of 100 ppb. Laboratory-detected total chromium concentrations ranged from 10.2 to 198 ppb, with an average concentration of 45.3 ppb.

Only one sample from the vertical profiling locations exhibited a detectable concentration of Cr^{+6} . A concentration of 15 ppb was reported from the 50 to 55-ftbgs depth interval at location VP-4. All other groundwater samples, including all field duplicates, exhibited a non-detect concentration of Cr^{+6} (less than 10 ppb). This indicates that all the detected total chromium was in the stable, non-mobile trivalent chromium (Cr^{+3}) valence state which is consistent with the 2002 investigation findings.

Monitoring well SC32D was also sampled for total chromium and Cr^{+6} , as well as Na, during the January 2007 quarterly groundwater monitoring event and all subsequent quarterly events (through October 2010). The analytical results from these sampling events indicated that total chromium and Cr^{+6} were not detected above their associated laboratory reporting limits. Sodium was detected at concentrations ranging from 4,180 to 6,870 ppb, well below the associated New Jersey GWQS of 50,000 ppb (there is no MCL for sodium).

2.3.6.3 Volatile Organic Compounds

The vertical groundwater profile samples were analyzed for VOCs to address the presence of TCE in the most downgradient wells on the Farm Parcel (i.e., monitoring wells SC1S, SC1D and SC31D), as well as concentrations in wells on or near the Lacroce property (i.e., SC28D and SC29D) and the 2002 Ground Water Investigation results. A total of 65 depth intervals were targeted for groundwater sampling (i.e., five sample intervals at each of thirteen sampling locations), with the majority of the depth intervals exhibiting the presence of VOCs and/or VOC tentatively identified compounds (TICs). VOCs detected during this investigation included chlorobenzene, chloroform, 1,1-dichloroethane (1,1-DCA), 1,1-DCE, 1,2-dichloroethene (total) (1,2-DCE), 1,1,1-TCA, TCE, PCE, toluene and vinyl chloride. It is noted that PCE was not used at SMC.

In addition, several samples exhibited concentrations of VOC TICs including acetone, alkane, alkene, carbon disulfide, cycloalkane/alkene, cyclohexane, dimethyl sulfide, methyl-tert-

butyl-ether (MTBE), propane, and 2-methoxy-2-methyl, as well as various “unknown” compounds.

Vertical profile results for TCE, PCE, total chromium, and Cr^{+6} are presented on Figure 2-11. In total, 22 sample intervals exhibited TCE and the majority of those detections (i.e., 19 of the 22 hits) were in exceedance of the New Jersey GWQS for TCE of 1 ppb (and 16 of the 22 hits were in exceedances of the TCE MCL of 5 ppb). The detected concentrations of TCE ranged from 0.65 to 169 ppb. Several of the vertical profiling locations exhibited TCE concentrations greater than 1 ppb at multiple depth intervals (VP-2, VP-3, VP-6, VP-8, VP-9A and VP-10), with the highest levels generally detected at greater depth. TCE was not detected in any of the sample intervals from vertical profiling locations VP-1, VP-5, VP-9, VP-11 and VP-12, while only the shallowest depth interval at VP-7 (i.e., 30 to 35-ftbgs) exhibited an estimated level of 0.65 ppb (Figure 2-11).

In addition to TCE, several of the vertical profiling locations exhibited concentrations of PCE in exceedance of the New Jersey GWQS of 0.4 ppb (but only one sample [VP-3(95-100)] exceeded the MCL of 5 ppb). These included locations VP-3 (southwest of Farm Parcel), VP-4 (northwest of Farm Parcel), VP-7 (south of Lacroce property), VP-9 (southeast of Site) and VP-10 (southwest of Farm Parcel) (Figure 2-11). Locations VP-3 and VP-4 exhibited the highest levels of PCE in the deepest sample intervals, ranging from 1.3 ppb to 38.6 ppb. Locations VP-7, VP-9 and VP-10 also exhibited PCE in exceedance of New Jersey GWQS; however, PCE was only detected in one sample interval from each of these locations. Vertical profiling locations VP-1 and VP-2 also exhibited detectable levels of PCE, ranging from 0.30 ppb to 0.38 ppb, but the levels were below the associated GWQS.

TCE is a first-order by-product of the breakdown of PCE and some of the highest levels of TCE (i.e., sample locations VP-3, VP-4 and VP-10) were detected in association with detections of PCE. In addition, other breakdown by-products of PCE and TCE, including 1,2-DCE and vinyl chloride, were detected in several of the vertical profiling sample intervals but at concentrations less than the New Jersey GWQS and MCL. In addition, vinyl chloride was detected at location VP-3 (95-100) at a concentration of 0.55 ppb. The New Jersey GWQS for vinyl chloride is 0.08 ppb and the MCL is 2 ppb. Locations VP-3 and VP-8 exhibited 1,1-DCE (a breakdown product of 1,1,1-TCA) at concentrations of 1.6 ppb and 7.4 ppb, respectively, at depths of 115 to 120 ftbgs and 80 to 85 ftbgs. These concentrations are greater than the GWQS

of 1 ppb but less than the MCL of 7 ppb for the sample from VP-3. The presence of PCE and 1,1,1-TCA (which were not historically used by SMC) suggests other potential VOC source area(s), as further discussed in Sections 2.3.4, 3.3 and 4.5.

The majority of the other VOCs detected in groundwater samples, including chlorobenzene, 1,1-DCA, and 1,1,1-TCA, were only detected intermittently at low levels. Chloroform was only detected at low levels at scattered depth intervals from several locations, including VP-1, VP-8, VP-9, VP-11 and VP-12. In addition, toluene, detected at several locations (i.e., VP-1, VP-2, VP-3, VP-5, VP-7, VP-8, VP-10 and VP-11) at various depths, was only detected at low levels (0.32 ppb to 4.8 ppb). It should be noted that toluene is considered a common laboratory contaminant by the EPA. Therefore, due to the low levels observed, it is possible that the concentrations of toluene represent laboratory artifacts.

Monitoring well SC32D was initially sampled on January 17, 2007 as part of the scheduled quarterly groundwater monitoring event and during subsequent quarterly sampling events (through October 2010). The groundwater from monitoring well SC32D has not exhibited detectable concentrations of any VOCs during this period.

2.3.6.4 Aquifer Chemistry

Vertical groundwater profiling samples were also analyzed for aquifer chemistry parameters including Fe^{+2} , methane, nitrite, and nitrate. Detectable levels of all three parameters were observed at the majority of vertical profiling locations at various depth intervals. Fe^{+2} concentrations ranged from <0.1 to 7.8 parts per million (ppm), with an average concentration of 1.40 ppm. Groundwater at monitoring well SC32D was also analyzed for Fe^{+2} during the January 2007 quarterly groundwater sampling event. Both laboratory analytical results and field testing results using the HACH Model IR-18C test kit indicated non-detectable concentrations of Fe^{+2} .

Methane was also detected in the majority of the vertical groundwater profiling samples at concentrations ranging from 0.11 ppb to 52.2 ppb. The average concentration of methane in the vertical profiling samples was 3.3 ppb. There is no established New Jersey GWQS or MCL for methane.

Nitrate (NO_3) was detected above laboratory detection levels in the majority of the vertical groundwater profiling samples, at concentrations ranging from 0.38 ppm to 25.3 ppm.

The average detected NO_3 concentration was 6.04 ppm. It should also be noted that only three sample intervals (VP-3 (95-100), VP-5 (25-30) and VP-10 (20-25)) exhibited detectable levels of nitrite (NO_2) at low concentrations ranging from 0.012 ppm to 0.019 ppm. However, two of the three detected concentrations (0.019 ppm in VP-3 (95-100) and 0.014 ppm in VP-10 (20-25)) were detected in association with some of the highest levels of NO_3 (25.3 ppm and 21.8 ppm in VP-3 and VP-10, respectively).

3.0 2009/2010 OU1 SUPPLEMENTAL RI INVESTIGATIONS

3.1 2009 Scope of Work

Following completion of the 2006 field work, the NJDEP directed additional delineation of the plume.

In accordance with the “*Phase II Supplemental Off-Site Investigation Work Plan*” (TRC, 2008) and approved by EPA and NJDEP on June 10, 2009, additional groundwater sampling was conducted.

The supplemental investigation expanded upon the results of previous investigations with the goals of:

- 1) Refining the horizontal and vertical delineation of chromium and TCE in groundwater to the northwest and southwest of SMC’s Farm Parcel, and
- 2) Installing and sampling downgradient sentinel wells.

The supplemental investigation field work was conducted between October 12, 2009 and December 7, 2009.

3.1.1 2009 Vertical Groundwater Profiling

3.1.1.1 Overview

The investigative technique of vertical groundwater profiling was used consistently in the groundwater RI work since 2002, including this OU1 Supplemental RI work. The technique of vertical profiling allows the acquisition of multiple groundwater samples at various depths from the same soil boring location, which, at this Site, improves the understanding of the vertical nature and extent of total chromium, Cr⁺⁶ and TCE contamination within their respective groundwater plumes.

For the 2009 OU1 Supplemental RI work, a total of five locations were selected for vertical groundwater profiling; three locations originally proposed in the work plan (VP-13 through VP-15) and the two “optional” locations (VP-13A and VP-15A) noted in the work plan. The locations of all vertical groundwater profiling soil borings, relative to the SMC facility, are presented in Figure 2-3. A detailed log containing information related to the drilling of each of the 2009 vertical profiling locations (e.g., soil descriptions, depth to clay confining layer (if identified), purge water description, purge rates and additional pertinent information) is presented in Table 3-1. All of the soil borings were drilled within the City of Vineland or

Cumberland County rights-of-way (ROWs). Street opening permits were obtained from the City of Vineland and Cumberland County prior to the initiation of all drilling activities (Appendix B). In addition, NJDEP-approved soil boring and monitoring well permits were obtained prior to the initiation of drilling activities (Appendix C).

3.1.1.2 Drilling and Sampling Techniques

Following proper underground utility clearance through New Jersey One Call (NJOC), the vertical groundwater profiling soil borings were completed by Uni-Tech Drilling Company, Inc. of Franklinville, New Jersey using truck-mounted hollow stem auger (HSA) drill rigs. A SAT was used in conjunction with the HSA drilling to perform the vertical groundwater profiling. Prior to commencing drilling, drilling equipment, including drill rods, augers, the SAT, etc., were decontaminated through a scrubbing and steam cleaning process. A decontamination pad was set up at the SMC facility at a concrete basin with a sump and a sump pump that pumped the spent decontamination water directly to the on-site treatment plant for treatment.

The SAT consisted of a five-foot length of 4.25-inch inside-diameter, hollow stem auger with cut-outs along the auger walls and a stainless-steel mesh (0.007-inch slot size) attached to the inside of the auger. The wire mesh allows groundwater to enter the auger while limiting the passage of fine soil particles. The SAT represented the lead auger at each profiling location and was equipped with a new, polypropylene, water-tight knock-out plug at the cutting head to prevent soil from entering the bottom of the auger. Standard five-foot-long hollow stem auger flights were subsequently attached to the SAT to drill to the desired depth.

Each of the vertical groundwater profiling locations were investigated with five depth intervals, targeted at each location for groundwater sampling (Table 3-1). Depth intervals were selected based on the projected depth of the top of the clay confining layer forming the base of the Cohansey aquifer, found at approximately 30 feet below mean sea level downgradient of the Farm Parcel. The deepest depth intervals were determined by subtracting the estimated top of clay layer elevations from the approximate ground surface elevations at each location. Shallower intervals were subsequently determined by separating the targeted intervals by 20 to 25 feet upward toward the estimated water table. TRC directed the drilling contractors to auger to each desired depth for sample collection. Based on field observations during vertical groundwater

profiling, the top of the clay layer was encountered at two of the five locations (VP-15 and VP-15A) (Table 3-1). At each of these two boring locations, the clay was visually confirmed on the lead auger upon retrieval of the SAT. In addition, the clay was potentially identified by the driller based upon variations of the downward vertical pressure on the auger flights during the drilling of VP-13. In each case, the clay layer was encountered no more than approximately 2 feet from the estimated final sample depth. This suggests that the final sample depth of locations at which the clay layer was not encountered were probably close to the clay layer. At each location where clay was believed to be encountered, all drilling was immediately ceased to avoid compromising the integrity of the aquifer confining layer.

At each vertical groundwater profiling location, an inflatable packer and submersible pump assembly was lowered inside the HSA once each desired sample interval was reached. This assembly allowed for the isolation of the groundwater within the auger to the SAT and the auger length immediately above the SAT, thereby eliminating the potential for cross-contamination and minimizing the volume of purge water. Because samples were collected at depths far below the water table, in an effort to further prevent the potential for cross-contamination, the augers were equipped with new O-rings to create a water tight seal at each auger connection. Prior to placement of the packer and pump assembly within the augers, all of the assembly equipment was decontaminated by scrubbing and purging with laboratory grade glassware detergent and water mixture followed by rinsing with tap water. This process was repeated prior to sampling each depth interval at every vertical profiling location.

Following decontamination, the packer and pump assembly were fitted with new, polyethylene tubing (1-inch outside diameter) and lowered to the desired sample depth. The packer was inflated with nitrogen gas. A small amount of nitrogen was released into the pump and SAT to clear the screen of fine material and enhance groundwater recovery. Then, three to five well volumes of standing water below the packer (approximately 21 to 35 gallons minimum) were purged to ensure that the formation water was moving freely into the SAT. The average purge rate for an individual sample interval was approximately 3.7 gpm, with an average total purge volume of approximately 80 gallons. All of the water pumped during the purging process was containerized in a 300-gallon tank and transported to SMC's on-site water treatment plant for treatment. After a sufficient volume of water was purged from the SAT, the flow rate of the submersible pump was reduced using a ball valve fitted to the polyethylene tubing in order to

minimize volatilization. This further reduced the amount of suspended solids in the purged water and allowed for the attachment of an in-line flow-through cell, equipped with a YSI-6820 multi-parameter meter. The YSI-6820 flow-through cell assembly was connected directly to the polyethylene purge tubing. Purging of the SAT continued at the reduced discharge rate while groundwater water quality indicator parameters (WQIPs) (i.e., pH, specific conductivity, turbidity, DO, temperature, and ORP) were monitored using the YSI-6820. Groundwater WQIPs were monitored for approximately 25 minutes (with readings recorded every three to five minutes) to monitor parameter stability of the sample water. The final recorded groundwater WQIPs for each sample are presented in Table 3-2.

3.1.1.3 Sampling and Handling

Following purging, groundwater samples from each depth interval were collected directly into properly pre-preserved (non-preserved containers for Fe^{+2} and Cr^{+6} analyses) laboratory-supplied bottles for analysis. At each vertical profiling location, each of the five depth intervals were sampled for VOCs, total chromium, Cr^{+6} , nitrate, methane and Fe^{+2} . A summary of all of the samples collected during this investigation is presented in Table 3-3. Following collection, the samples were immediately placed on ice in laboratory-supplied coolers prior to shipment. All samples were subsequently checked for accurate labels and tightly secured caps, placed on ice in coolers with temperature blanks and properly filled out chain-of-custody forms, and the coolers were sealed with custody tape. Sample coolers were then submitted to Accutest Laboratories of Dayton, New Jersey (Cr^{+6} analysis) and Marlborough, Massachusetts (VOCs, total chromium, nitrate, methane and Fe^{+2} analyses), each New Jersey-certified laboratories, under chain-of-custody via hand-delivery, courier pickup or overnight shipment via Federal Express.

In addition to the samples collected for laboratory submittal, a second aliquot from each sample interval was retained and field tested for total alkalinity using a HACH model AL-AP Drop Count Titration Test Kit. The total alkalinity field test results are provided in Table 3-2.

3.1.1.4 Quality Assurance/Quality Control

Field quality control samples were also collected throughout this investigation in accordance with the NJDEP Field Sampling Procedures Manual (NJDEP, 2005). This included

the collection of one field blank during each day of vertical groundwater profiling sampling. Each field blank consisted of pouring laboratory-supplied, demonstrated analyte-free water over/through a decontaminated submersible pump and clean tubing directly into laboratory-supplied bottles. Each field blank was preserved in the same manner as groundwater samples and submitted to the laboratory for VOC, total chromium, Cr^{+6} , nitrate, methane and Fe^{+2} analysis. Due to a lack of laboratory supplied sample containers, the field blank collected on October 16, 2009 (FB101609) was not analyzed for methane or Fe^{+2} and the field blank collected on October 19, 2009 (FB101909) was not analyzed for Fe^{+2} . Field blank water and samples associated with the vertical groundwater profiling did not exceed the maximum 4-day handling time specified by the NJDEP (NJDEP, 2005).

A trip blank was submitted to the laboratory during each day of vertical groundwater profiling along with the shipment of groundwater samples. The trip blanks were supplied by the laboratory, traveled with the sample bottles for no more than two calendar days, and were submitted for laboratory VOC analysis. A summary of the field, trip and method blank samples is presented in Table 3-4.

Field duplicates were also collected at a rate of 5% of the total number of samples collected during the investigation and were submitted to the laboratory as “blind” samples. The duplicate groundwater samples were collected by alternately filling sample containers. “Blind” samples were labeled with a fictional sample identification number and time and were submitted to the laboratory for VOC, total chromium, Cr^{+6} , nitrate, methane and Fe^{+2} analyses. All duplicate samples were noted as such in the field book. Field duplicate samples are noted in Table 3-3.

3.1.1.5 Borehole Abandonment/Waste Management

Following completion of all sampling at each vertical groundwater profiling location, the borehole was properly sealed and abandoned by tremie grouting to the ground surface in accordance with NJDEP regulations (NJAC, 2001). Each borehole was grouted by first using decontaminated drill rods to knock out the bottom plug inside the SAT. A tremie pipe was then used to pump bentonite slurry inside the augers while the augers were slowly retracted from the ground. Soil cuttings created during both auger advancement and retraction were collected in DOT-approved 55-gallon drums, sealed, labeled with the soil boring location and date, and

moved to the SMC facility warehouse for storage prior to proper disposal. As necessary, the boreholes were sealed at the surface using Type II Portland Cement to prevent settling. All of the boreholes were regraded with top soil and seeded to return each drilling site to pre-drilling conditions, with the exception of borehole location VP-15, which was grouted up to pre-existing grade and then finished with asphalt cold-patch.

Following completion of a soil boring, all drilling equipment was properly decontaminated. This included scrubbing and purging the packer and pump assembly with a laboratory grade glassware detergent and water mixture, followed by rinsing with tap water and steam cleaning at the on-site decontamination pad. In addition, the SAT, augers, drill rods and tremie piping were scrubbed and steam cleaned at the on-site decontamination pad prior to use at the next vertical groundwater profiling location.

3.1.2 2009 Monitoring Well Installation

3.1.2.1 Overview

Four monitoring wells were installed as part of the Supplemental RI work. Two monitoring wells (SC35D and SC36D) were installed as sentinel wells. These sentinel wells were installed adjacent to vertical profile locations (VP-15A and VP-13A, respectively) that exhibited no total chromium, Cr^{+6} , or VOCs associated with historical releases from the SMC facility (i.e., TCE). Additionally, two monitoring wells were installed adjacent to two 2006/2007 vertical profile locations (VP-7 and VP-8), which exhibited relatively elevated total chromium concentrations. Monitoring well SC33D was installed adjacent to vertical profile location VP-7, located within the municipal ROW along Strawberry Lane. Monitoring well SC34D was installed adjacent to vertical profile location VP-8, located within the municipal ROW along West Arbor Avenue. Permanent monitoring wells SC33D and SC34D were installed to investigate if the total Cr detected in groundwater samples collected from vertical profiles VP-7 and VP-8 was the result of suspended soil particulates in the samples (i.e., elevated turbidity caused by the SAT) and to quantify the concentrations of Cr^{+3} and Cr^{+6} in the groundwater.

Prior to the initiation of any drilling activities, a monitoring well permit was obtained from the NJDEP. It should also be noted that none of the vertical profiling boreholes were converted into monitoring well(s) immediately following the completion of sampling because 24-hour turnaround times for sample analyses could not be provided by the laboratory.

Therefore, Uni-Tech Drilling Company, Inc. installed monitoring well SC33D on October 20, 2009, SC34D on October 21, 2009, SC35D on October 29, 2009 and SC36D on November 3, 2009. Each monitoring well was installed using mud rotary methods under the oversight of TRC. Prior to commencing well installation activities, all equipment (i.e., augers, drill rods and split spoons) was decontaminated at the on-site decontamination pad through a scrubbing and steam cleaning process as described previously.

3.1.2.2 Well Construction Summary

Split spoon soil samples were collected every 10 feet during the drilling process using 2-foot spoons. The soil samples were geologically logged with a general soil description (e.g., grain size distribution, color, moisture, staining and odors). During drilling, all soil cuttings were containerized in DOT-approved 55-gallon drums and were labeled and subsequently transported to the SMC facility warehouse for proper storage prior to disposal.

Monitoring wells SC33D, SC34D, SC35D, and SC36D were completed with screened interval bottom depths at 92.5, 140, 99.5, and 117 ftbgs, respectively. Each monitoring well was installed using two-inch diameter Schedule 40 PVC riser pipe and screen. Ten feet of 0.010-inch slot screen was used with flush-threaded riser pipe to the ground surface. A gravel pack of FilPro #0 sand was used and placed in the annular space to a depth of 3 to 5 feet above the top of the screen. A 2- to 4.5-foot thick layer of Ricci Bros. #00 sand was used as a seal above the gravel pack. To ensure a proper gravel pack and seal, the #0 and #00 sands were placed in the annular space via the tremie method. Once the gravel pack and seal were completed, a cement/bentonite grout mixture was tremied into the remaining annular space. The monitoring wells were completed by a locking, water-tight, flush-mounted curb-box. As previously mentioned, all soil cuttings and drilling mud generated during monitoring well installation was containerized and returned to the SMC facility for proper storage. Representative samples of the drill cuttings were collected for waste characterization. After characterization, the drums of drill cuttings were transported off-site on July 7, 2010 via a non-hazardous waste manifest by TIER of Gap, Pennsylvania and properly disposed of at the American Landfill in Waynesburg, Ohio. The drill cuttings were characterized as “Non-Regulated Material, Non-RCRA/Non DOT”. Monitoring well construction log diagrams, driller-certified well completion forms (Form A), and location certification forms (Form B) are included in Appendix D.

Each monitoring well was developed using a surge and pump technique. Each well was developed with the goal of providing turbidity-free water. A turbidity meter was used to measure nephelometric turbidity units (NTUs). Well development details are provided in Table 3-5. All development water was containerized in a truck-mounted polyethylene tank (700-gallon capacity) and transported to the SMC on-site groundwater treatment plant facility for treatment. Monitoring well development logs are included in Appendix E.

3.1.2.3 Groundwater Sampling

Following the development of the newly installed monitoring wells, the wells were allowed to equilibrate prior to being sampled on November 19, 2009 (SC33D and SC34D) and December 7, 2009 (SC35D and SC36D) during the routine groundwater sampling program for the Site. Groundwater samples were collected in accordance with the updated sampling and analysis plan: Ground Water Sampling and Analysis Plan – RCRA Monitoring Wells (TRC, 2005b). Groundwater samples from each monitoring well were analyzed by the laboratory for VOCs, total chromium, Cr^{+6} , sodium, sulfate, nitrate, methane, and Fe^{+2} . Groundwater samples were also field tested for temperature, pH, specific conductivity, DO, and ORP, using a YSI 600 XLM multi-parameter meter, turbidity using a Lamotte 2020 Turbidity Meter, alkalinity using a HACH model AL-AP Drop Count Titration Test Kit, and Fe^{+2} using a HACH ferrous iron Model IR-18C test kit.

3.2 2009 Analytical Results

3.2.1 Overview

The results of the 2009 OU1 Supplemental RI are presented in the following sections and on Figure 2-11. The field screening and laboratory analytical results for the vertical groundwater profiling samples are presented in Table 3-6. The field screening and laboratory analytical results for the monitoring well samples are presented in Table 3-7. Field quality control sample (i.e., field blank and trip blank) analytical results are presented in Table 3-8. Electronic data deliverables (EDDs) have also been provided by Accutest for all of the analytical results. NJDEP HAZSITE-formatted EDDs for the vertical groundwater profiling analytical results are provided on diskette and included as Appendix F.

3.2.2 Field Parameters

The groundwater WQIPs tended to stabilize fairly well prior to sample collection. Although the ORP level generally increased during purging, it usually progressed slowly.

All of the vertical profiling groundwater samples were also field-tested for alkalinity. A HACH Drop Count Titration Test Kit was used to measure a low range (5 ppm to 100 ppm) phenolphthalein alkalinity and methyl orange alkalinity. Total alkalinity is calculated as the sum of the phenolphthalein alkalinity and the methyl orange alkalinity values. The phenolphthalein alkalinity was zero in all of the analyzed samples due to the low pH of the groundwater (less than 6). Therefore, the methyl orange alkalinity is representative of the total alkalinity. All total alkalinity values were low, ranging from 5 ppm to 50 ppm with an average concentration of approximately 10 ppm. A summary of the field-tested alkalinity results are presented in Tables 3-6 and 3-7. It should be noted that field blank samples were not analyzed for alkalinity.

3.2.3 Laboratory Results

3.2.3.1 Metals

The vertical groundwater profiling samples were submitted for laboratory total chromium and Cr^{+6} analyses. Total chromium was only detected above the associated laboratory reporting limit in one vertical groundwater profiling sample collected from VP-14 at 35-40 ftbgs (13.1 ppb). The detected concentration was much lower than the clean-up criterion and MCL of 100 ppb. Cr^{+6} was not detected above the associated laboratory reporting limit in any vertical groundwater profiling samples. Total chromium and Cr^{+6} results for the vertical groundwater profiling samples are presented in Table 3-6.

Monitoring wells SC33D, SC34D, SC35D, and SC36D, installed during the 2009 investigations, were sampled for total chromium and Cr^{+6} , as well as Na, during the November and December 2009 monthly groundwater monitoring events. Total chromium was not detected in any groundwater sample above the associated laboratory reporting limit. Cr^{+6} was only detected in the groundwater sample collected from monitoring well SC33D, at a concentration of 4.9 ppb, considerably less than the clean-up standard. The detected concentration was greater than the laboratory minimum detection limit but was also less than the laboratory reporting limit. Sodium was detected in groundwater samples collected from monitoring wells SC33D, SC35D, and SC36D at concentrations of 7,290 ppb to 28,500 ppb, which are well below the associated

New Jersey GWQS of 50,000 ppb, and in the groundwater sample collected from monitoring well SC34D at a concentration of 67,000 ppb. Each of these wells was subsequently sampled during routine Site groundwater sampling during April and October 2010 with no detections of total chromium or Cr^{+6} . The analytical results for the monitoring well sampling are presented in Table 3-7.

3.2.3.1.1 Discussion

Groundwater data from the 2006 and 2009 OU1 Supplemental RI studies indicate that the total chromium from temporary wells was detected southwest and slightly downgradient of the SMC Facility (Figures 3-1 and 3-2). The highest concentrations of total chromium from the temporary wells were detected in the groundwater samples collected from vertical profile VP-2 and ranged between 13.1 ppb and 43.8 ppb. Low-level total chromium concentrations were also detected in groundwater samples collected from vertical profiles VP-3 and VP-10 ranging between 11.7 ppb and 29.7 ppb. No chromium was detected in groundwater samples collected from vertical profiles VP-15 and VP-15A and monitoring well SC35D.

Total chromium was detected at a number of the OU1 Supplemental RI temporary, vertical profiling locations and each of the three 2002 investigation locations without corresponding Cr^{+6} detections. This indicates that the total chromium is in the more stable (and less toxic) form of Cr^{+3} as the plume moves away from the Site. We believe that Cr^{+3} was detected in the vertical profiling groundwater samples due to the mechanics of the hollow-stem augering technique, mobilizing aquifer soils with adsorbed Cr^{+3} . It is typical for metals to show higher readings in temporary wells, due to turbidity. Supporting this view, the vertical profiling locations that exhibited relatively high Cr^{+3} concentrations (VP-7 and VP-8) also exhibited high turbidity values (146-384 NTUs), indicating a high sediment content. The one sample interval from VP-7 that did not exhibit a detectable concentration of Cr^{+3} had no measurable turbidity (0 NTUs). In addition, groundwater samples collected from permanent monitoring wells installed at vertical profile locations VP-1 (2002), VP-7, and VP-8 (SC30D, SC33D, and SC34D, respectively) did not exhibit detectable concentrations of total chromium. This provides further strong evidence that Cr^{+3} was detected in the temporary vertical profiling groundwater samples due to the mechanics of the hollow-stem augering technique, which mobilized aquifer soils with adsorbed Cr^{+3} and increased the turbidity of the groundwater samples.

Data from the July 2006 ground water sampling event for geochemistry parameters were plotted on an oxidation potential (Eh) - pH equilibrium diagram for aqueous solutions of chromium (Figure 3-3). According to the geochemistry of the aquifer (i.e., Eh and pH), all groundwater data obtained during the July 2006 sampling event indicated that the Cr^{+6} is reduced to Cr^{+3} under equilibrium conditions. The Eh and pH data collected from monitoring wells SC33D (0.008 V and 9.75, respectively) and SC34D (0.129 V and 7.08, respectively) on November 19, 2009 also plot within the same zone (i.e., Cr^{+3}) on the Eh-pH equilibrium diagram and continues to indicate that the Cr^{+6} is reduced to Cr^{+3} under equilibrium conditions. Note that Cr^{+3} is a much less mobile (and less toxic) species than Cr^{+6} . As Cr^{+6} in groundwater migrated from the site, the aquifer conditions reduced Cr^{+6} to a more stable, less mobile, and less toxic form (i.e., Cr^{+3}).

This Eh-pH data indicates that the aquifer is under reducing environments in the studied area, which is beneficial to supporting natural attenuation mechanisms.

3.2.3.2 Volatile Organic Compounds

The vertical groundwater profiling samples and the four new monitoring well samples were analyzed for VOCs. Vertical profile groundwater samples were collected from a total of 25 depth intervals (i.e., five sample intervals from each of five sampling locations). VOCs and/or VOC TICs were detected in 9 of the 25 intervals and in two of the four monitoring wells. Volatile organic compounds detected during this investigation include benzene, carbon tetrachloride, chloroform, 1,1-DCA, 1,2-DCE, methylene chloride, TCE, PCE, toluene, and xylenes (total). In addition, three vertical profile sample depths from location VP-15 and one monitoring well sample (SC33D) exhibited concentrations of VOC TICs including dimethoxymethane, methyl-guanidine, as well as an “unknown” compound. Summaries of all of VOC analytical results are presented in Table 3-6 and Table 3-7. The primary VOC of concern, TCE, and a secondary VOC of concern detected off site, PCE are discussed below.

3.2.3.3 TCE

One of the major objectives of this investigation was to delineate the horizontal and vertical extents of the southwestern and northwestern portions of the TCE plume. TCE was not

detected in the new sentinel well, SC35D (southwest of the Site), or the side-gradient well, SC36D (west of the Site). This indicates that delineation was achieved.

TCE detections in other wells and vertical profiling locations are helpful in detailing the plume. TCE was detected in at least one groundwater sample interval in three of the five vertical profiling locations (VP-13, VP-14, and VP-15) and the groundwater sample collected from monitoring well SC34D, all of which were in exceedance of the New Jersey GWQS for TCE of 1 ppb but only two samples (VP-14(130-135) and SC34D) in exceedance of the MCL of 5 ppb. The concentrations of TCE ranged from 3.2 ppb to 35.7 ppb. The highest concentration of TCE was detected in monitoring well SC34D (35.7 ppb), which is located upgradient of VP-14, VP-15, and VP-15A and cross-gradient to VP-13 and VP-13A. TCE was detected in VP-13 at 75-80 ftbgs (3.2 ppb), but no TCE was detected at the shallower or deeper depth intervals. TCE was detected in VP-15 at 88-93 ftbgs (3.8 ppb), but no TCE was detected at the shallower or deeper depth intervals. TCE was not detected at any depth interval in the vertical profile borings advanced side-gradient of VP-13 and downgradient of VP-15 (VP-13A and VP-15A, respectively). TCE was detected in VP-14 at 105-110 ftbgs (3.9 ppb / 4.0 ppb in duplicate sample) and at 130-135 ftbgs (16.1 ppb). The highest concentration of TCE at vertical profiling location VP-14 (16.1 ppb) was detected in the deepest sample depth interval (130-135 ftbgs).

3.2.3.4 PCE and other CVOCs

During the 2006-2007 vertical profiling investigation, PCE was detected at several locations and depth intervals in exceedance of the New Jersey GWQS of 0.4 ppb but only one location in exceedance of the MCL of 5 ppb. The presence of PCE (not used by SMC) suggests other potential VOC source area(s), as further discussed in Sections 2.3.4, 3.3 and 4.5.

PCE was not detected in any vertical profile samples during the 2009 OU1 Supplemental RI. In 2009, PCE was only detected in the groundwater sample collected from monitoring well SC33D at a laboratory estimated concentration of 0.74 ppb, exceeding the New Jersey GWQS (but below the MCL).

The majority of the other VOCs detected in groundwater samples, including benzene, carbon tetrachloride, chloroform, 1,1-DCA, 1,2-DCE, methylene chloride, toluene, and xylenes (total) were only detected intermittently and generally at low levels. Carbon tetrachloride and benzene were the only other VOCs to be detected above their respective New Jersey GWQS (but

only above the MCL for benzene (5 ppb)). Carbon tetrachloride was only detected in one sample, at VP-13 (50-55 ftbgs), at 1.7 ppb, which exceeds the New Jersey GWQS of 0.4 ppb (but not above the MCL of 5 ppb). Carbon tetrachloride is not a known contaminant of concern associated with the Site and suggests other potential source area(s).

Benzene was detected at VP-13A at 62-67 ftbgs (894 ppb), 87-92 ftbgs (1.7 ppb) and 111-116 ftbgs (1.2 ppb). The detected concentrations exceed the New Jersey GWQS of 0.2 ppb and the MCL in only the 62- to 67-foot interval. Although benzene was historically detected in a couple of on-site wells (SC20S and SC23S), the detected concentrations (<80 ppb) were much lower than that detected in VP-13A. Furthermore, VP-13A is located approximately 3,000 feet due west of the Site (side gradient), which is not in the direction of groundwater flow (i.e., southwest). Following an upgradient (i.e., northeast) trend from VP-13A, this may put a possible benzene source along a linear path leading to other potential sources near the middle of the Town of Newfield, but not the SMC facility. Along this linear path are extensive woods and farmland with very little human built up areas. Therefore, this suggests other possible source area(s) for the benzene detected in VP-13A.

3.2.3.5 Aquifer Chemistry

Vertical groundwater profiling samples were also analyzed for aquifer chemistry parameters including Fe^{+2} , methane and nitrite/nitrate (Table 3-6). Detectable levels of Fe^{+2} , methane and nitrate were observed in the majority of vertical profiling locations at various depth intervals. Fe^{+2} concentrations ranged from <0.1 ppm to 1.7 ppm, with an average concentration of 0.34 ppm. The highest Fe^{+2} concentrations were detected in vertical profiling location VP-13A, with concentrations of 1.7 ppm, 0.25 ppm, 0.78 ppm, 0.25 ppm, and <0.1 ppm detected in the shallowest to deepest sample intervals, respectively, with an average concentration of 0.6 ppm. There is no established New Jersey GWQS or MCL for Fe^{+2} . Newly- installed monitoring wells SC33D, SC34D, SC35D, and SC36D were also analyzed for Fe^{+2} during the November and December 2009 monthly groundwater sampling events using both field screening and laboratory analyses. No Fe^{+2} was detected in the groundwater samples from each monitoring well using the HACH Model IR-18C test kit. However, low concentrations of Fe^{+2} were detected in the laboratory analysis of groundwater samples from SC33D (0.095 ppm) and SC34D

(0.28 ppm). Fe^{+2} was not detected above the associated laboratory reporting limit in groundwater samples from monitoring wells SC35D and SC36D.

Methane was also detected in the majority of the vertical groundwater profiling samples at concentrations ranging from <0.3 ppb to 102 ppb. The average concentration of methane in the vertical profiling samples was 6.3 ppb. There is no established New Jersey GWQS or MCL for methane. The highest concentrations of methane were detected in samples from vertical profiling location VP-13A. Samples VP-13A (15-20) and VP-13A (62-67) exhibited concentrations of 8.73 ppb and 102 ppb, respectively. Methane analytical results are presented in Table 3-6. Methane was also detected in each of the monitoring well samples (SC33D, SC34D, SC35D, and SC36D) at concentrations ranging from 0.34 ppb (SC35D) to 11.9 ppb (SC34D).

Nitrate (NO_3) was detected above laboratory detection levels in all but one of the vertical groundwater profiling samples (NO_3 was non-detect at VP-15 [114-119]), at concentrations ranging from 0.78 ppm to 24.6 ppm. The average detected NO_3 concentration was 7.8 ppm. A total of seven sample intervals from various vertical profiling locations (VP-13, VP-13A, and VP-14) exhibited concentrations of NO_3 above the associated New Jersey GWQS of 10 ppm (and MCL for nitrate of 10 ppm). Vertical profiling location VP-14 exhibited the highest concentrations of NO_3 , with an average concentration of 13.88 ppm. NO_3 was detected in each of the monitoring well samples at concentrations ranging from 2.2 ppm to 3.8 ppm. It should also be noted that only two sample intervals (VP-13A [15-20] and VP-13A [62-67]) exhibited detectable levels of nitrite (NO_2) at low concentrations of 0.019 ppm each. Nitrite was detected in two of four monitoring well samples at a concentration of 0.017 ppm in each sample.

Sulfate was detected above laboratory detection levels in each of the monitoring well samples (SC33D, SC34D, SC35D, and SC36D) at concentrations ranging from 6.6 ppm to 316 ppm. The highest concentration of sulfate in SC34D (316 ppm) exceeded the New Jersey GWQS of 250 ppm. The average detected sulfate concentration was 91 ppm.

Many of these aquifer chemistry parameters are useful in understanding the potential for monitored natural attenuation (MNA), discussed in Section 4.3.

3.2.3.6 Quality Assurance/Quality Control Samples

None of the field blanks or trip blanks submitted for laboratory analysis throughout the investigation exhibited detectable levels of any target VOCs. However, quality assurance/quality control (QA/QC) samples TB101309, TB101409, TB101909, TB102009, and FB102209 exhibited estimated concentrations of methylene chloride, which is a common laboratory contaminant. In addition, benzene was detected in QA/QC sample FB102209 at a concentration of 0.85 ppb. Note that the highest concentration of benzene in the groundwater vertical profile samples (894 ppb) was detected in a sample from VP-13A (62-67). QA/QC sample FB102209 was collected immediately after sampling VP-13A (62-67) and decontaminating the packer / pump assembly. The low level of benzene detected in FB102209 may have been residual benzene contamination on the packer / pump assembly from the VP-13A (62-67) sample despite prior decontamination efforts. The VOC analytical results for all of the QA/QC samples are presented in Table 3-8.

None of the field blanks submitted for laboratory analyses exhibited detectable levels of total chromium or Cr^{+6} (greater than 10 ppb). No sodium was detected in the field blank sample collected during groundwater sampling (FB111909).

Each field blank collected during this investigation was also submitted for aquifer chemistry parameters by laboratory analysis, including methane, Fe^{+2} , nitrate, and nitrite. The field blank sample collected during groundwater sampling (FB111909) was also analyzed for sulfate. The majority of the field blank samples exhibited a detectable level of methane. Methane concentrations ranged from <0.3 ppb to 0.99 ppb, with an average concentration of 0.26 ppb. None of the field blanks submitted for laboratory analyses exhibited detectable levels of Fe^{+2} , nitrate, or nitrite. All of the QA/QC sample analytical results are presented in Table 3-8.

3.3 Investigation of Non-SMC Sources Near Corner of South West Boulevard and Weymouth Road

Supplemental vertical profiling, well installation and groundwater sampling activities were conducted pursuant to correspondence from TRC to the EPA dated September 1, 2010 (TRC, 2010a) and October 18, 2010 (TRC, 2010b). Specifically, this additional work was conducted near the corner of South West Boulevard and Weymouth Road with the goal of aiding in the determination of potential non-SMC contributions to the chromium and chlorinated VOC

plumes. As indicated in Section 2.3.4, previous NJDEP studies have documented that several businesses near the intersection of South West Boulevard and Weymouth Road have had releases of solvents. A number of additional businesses are potential contributors of solvents. In addition, one business (with documented releases via septic fields) operated a chromium plating operation. Some of the solvent contributions were investigated by the NJDEP and certain private parties, however, to TRC's knowledge, the potential contributions from the chrome plating operations had not been investigated.

This supplemental work was conducted between October 4 and November 4, 2010.

3.3.1 2010 Vertical Groundwater Profiling

3.3.1.1 Overview

Four vertical profiling locations, designated VP-16 through VP-19, were selected to evaluate potential non-SMC sources of chromium and VOCs and to aid in determining the optimal locations for the subsequent installation of permanent monitoring wells. In accordance with the September 1, 2010 correspondence to the EPA and as shown in Figure 2-3A, one of the vertical profiling points (VP-16) was drilled within the Weymouth Road ROW, whereas the other three vertical profiling points (VP-17, VP-18 and VP-19) were drilled just to the east of the property line between the car wash and the Wheaton Industries/Galena Lead Crystal site that is located to the west of the car wash. The street opening permit obtained from Cumberland County prior to the start of work is contained in Appendix B. In addition, the NJDEP-approved soil boring permits associated with the vertical profiling work are contained in Appendix C.

3.3.1.2 Drilling and Sampling Techniques

Subsequent to the completion of the underground utility clearance through the NJOC system, the vertical profiling activities were carried out by Zebra Environmental Corporation of Lynbrook, New York using a direct-push Geoprobe[®] 8040DT rig. This work was conducted under the direct supervision of TRC personnel. Prior to the start of the drilling activities, as well as between sampling locations, the drilling and sampling equipment was decontaminated. Decontamination was conducted by washing equipment with a laboratory grade detergent and water mixture, followed by rinsing with tap water and steam cleaning. The decontamination fluids were pumped via sump pump directly to SMC's on-site plant for treatment.

Using the same means as described for determining the target sample depths for the 2009 vertical profiling effort, five depth intervals were identified for groundwater sampling at each of the 2010 vertical profiling locations. The vertical groundwater profiling consisted of advancing 2.25-inch diameter direct-push rods (outfitted with new O-rings at each rod junction) and a sampling screen to a maximum depth of 124 ftbgs. After reaching the final depth, the rods were retracted to expose a four-foot length, 0.04-slot screen to the formation.

A foot valve and Teflon tubing connected to an oscillating pump was used to purge at least three casing volumes prior to sampling. During the purging process, WQIPs (i.e., pH, specific conductivity, turbidity, DO, temperature, turbidity and ORP) were monitored via a flow-through cell with a YSI-6820 multi-parameter meter. The WQIP field measurements were monitored every five minutes and recorded on groundwater sampling measurement sheets that are included in Appendix E. The final recorded groundwater WQIPs for each sample are included in Table 3-2.

After purging and collecting the sample from the deepest interval at each vertical profiling point, the rods and screen were pulled up to the next sampling interval and the purging/sampling procedures were repeated. The water pumped during the purging process was containerized in a plastic tank and transported to the SMC's water treatment plant for treatment.

3.3.1.3 Sampling and Handling

Groundwater samples were collected from each designated sample depth at each vertical profiling location after at least three casing volumes were purged and the WQIP field measurements stabilized to within prescribed tolerances. Groundwater sample aliquots were collected directly from the Teflon tubing and transferred into the appropriate laboratory-supplied containers for total chromium and Cr⁺⁶ (filtered and unfiltered) and VOCs. Table 3-3 includes details on the sample depth intervals and parameters. Following the collection of samples from each location, they were placed on ice in laboratory-supplied coolers. The samples were subsequently managed and handled in accordance with the procedures outlined in Section 3.1.1.3. All samples were submitted under proper chain-of-custody protocols to Accutest Laboratories of Dayton, New Jersey via laboratory courier.

3.3.1.4 Borehole Abandonment

Following completion of all sampling at each vertical profiling location, the boreholes were properly sealed and abandoned in accordance with NJDEP Technical Requirements for Site Remediation (N.J.A.C 7:26E). Each borehole was grouted using a tremie pipe to pump bentonite slurry from the bottom of the borehole to the surface. As necessary, the boreholes were sealed at the surface using Type II Portland Cement to prevent settling. All of the boreholes were regraded with top soil to return the site to pre-drilling conditions.

3.3.2 Piezometer Sampling

3.3.2.1 Overview

In addition to the groundwater samples obtained from the vertical profiling points, TRC collected groundwater samples on October 5, 2010 from selected piezometers preexisting at the study location. It is believed that the piezometers were installed during the NJDEP investigations in the area. Specifically, piezometers located near vertical profiling points VP-18 and VP-19 were chosen for sampling. Since no well construction information was available for the selected piezometers, the nested piezometers located near vertical profiling point VP-18 were labeled A-S (shallow) and A-D (deep) and the nested piezometers near vertical profiling point VP-19 were labeled D-S (shallow) and D-D (deep). The locations of the nested piezometers are shown on Figure 2-3A.

Because details regarding the construction of the piezometers were not available to us, TRC personnel began by measuring water levels and the total depths of the piezometers. It was observed that the piezometers were constructed of a 1-inch diameter PVC. The shallow piezometers measured approximately 17 feet deep and the deep piezometers were approximately 26 feet deep.

3.3.2.2 Groundwater Sampling - Piezometers

Prior to sampling the piezometers, water levels were obtained and recorded on the groundwater sampling logs. Approximately three volumes of water were purged from each piezometer using a peristaltic pump. WQIP measurements (i.e., pH, specific conductivity, turbidity, DO, temperature, turbidity and ORP) were monitored via a flow-through cell with a YSI-6920 meter. The WQIP field measurements were obtained before purging, after purging,

and after sampling. The WQIP field measurements were recorded on groundwater sampling measurement sheets that are provided in Appendix E.

The groundwater samples were collected using decontaminated, dedicated Teflon bailers and the samples were transferred into the appropriate preserved and unpreserved containers supplied by the laboratory. The groundwater samples were placed on ice and submitted to Accutest Laboratories, under proper chain-of-custody procedures, for the analysis of total chromium, Cr⁺⁶, and VOCs.

3.3.3 2010 Monitoring Well Installation

Based on the analytical results for groundwater samples obtained from the vertical profiling points, permanent wells were proposed at the locations of vertical profiling points VP-16 and VP-17 to investigate potential non-SMC sources of chlorinated VOCs and chromium. Notification to the EPA regarding the proposed locations of these wells was provided prior to installation via correspondence from TRC dated October 18, 2010 (TRC, 2010b).

Prior to the initiation of the drilling activities, the appropriate permits were obtained from the NJDEP (see Appendix C). On October 19 and 20, 2010, monitoring wells SC-37S and SC-38I were installed by East Coast Drilling, Inc. of Moorestown, New Jersey using hollow stem auger drilling methods. This work was conducted under the supervision of TRC personnel. Prior to the start of drilling activities and between locations, the drilling equipment was decontaminated and decontamination fluids were handled in accordance with the same procedures outlined in Section 3.3.1.2.

Monitoring well SC-37S was installed adjacent to vertical profiling point VP-16, located within the Weymouth Road ROW and in front of the Wheaton Industries/Galena Lead Crystal facility to a depth of 25 ftbgs. Well SC-38I was installed adjacent to vertical profiling point VP-17, located near the property boundary between the car wash and Wheaton Industries/Galena Lead Crystal site to a depth of 50 ftbgs. The locations of these wells are shown on Figure 2-3A.

3.3.3.1 Well Construction Summary

Continuous split spoon soil samples were collected at the anticipated screen intervals to determine the highest yield zone in which to set the well screen. Specifically, continuous split spoon samples were collected at two-foot intervals at well location SC-37S from 18 to 30 ftbgs

and at well location SC-38I from 40 to 54 ftbgs. The soil samples were geologically logged with a general soil description (e.g., grain size distribution, color, moisture, staining and odors). During drilling, all soil cuttings were containerized in DOT-approved 55-gallon drums and were labeled and subsequently transported to the SMC facility for future characterization and disposal.

Monitoring wells SC-37S and SC-38I were constructed with a 5-foot section of 2-inch diameter, 10-slot Schedule 40 PVC screen and riser. A gravel pack of #0 sand pack was placed in the annular space to a depth of 5 feet above the top of the screen. A 2-foot thick layer of bentonite slurry was used as a seal above the gravel pack. Following gravel pack and seal completion in the wells, a cement/bentonite grout mixture was tremied into place in the remaining annular space. The wells were completed with water-tight, flush-mounted curb-boxes and locking sanitary plugs. Monitoring well construction log diagrams and certified well completion forms (Form A) are included in Appendix D.

Following the well completion, the wells were developed for at least one hour using a submersible pump with the goal of providing turbidity-free water. Well development details are provided in Table 3-5. Development water was pumped into a plastic tank, transported, and discharged into the facility's waste water treatment plant at the end of the day.

3.3.3.2 Groundwater Sampling – Monitoring Wells

Following the well installation, wells SC-37S and SC-38I were allowed to equilibrate and groundwater samples were collected on November 4, 2010. Prior to sampling the wells, water level measurements were obtained from the wells and recorded on groundwater sampling logs. Approximately three volumes of water were purged from the wells using a Grundfos submersible pump and the purged water was containerized in a plastic tank and transported to the SMC's water treatment plant for treatment. WQIP measurements (i.e., pH, specific conductivity, turbidity, DO, temperature, turbidity and ORP) were monitored via a flow-through cell with a YSI Model 6920 Sonde. The WQIP field measurements were obtained before purging, after purging, and after sampling and recorded on groundwater sampling measurement sheets that are provided in Appendix E.

The groundwater samples were collected using dedicated Teflon bailers and the samples were transferred into appropriate laboratory-supplied containers. The groundwater samples were

placed on ice and submitted to Accutest Laboratories, under proper chain-of-custody protocols, for the analysis of total chromium, Cr⁺⁶ and VOCs.

3.3.4 2010 Analytical Results

3.3.4.1 Overview

The results of the 2010 investigation are presented in the following sections and are provided on Figure 3-4. The laboratory analytical results associated with the vertical groundwater profiling effort at the car wash site are presented in Table 3-9. The analytical results associated with the piezometers sampling and monitoring well sampling are presented in Tables 3-10 and 3-11, respectively. NJDEP HAZSITE-formatted EDDs for the vertical groundwater profiling and monitoring well/piezometer sampling analytical results are provided on diskette and included as Appendix F

3.3.4.2 Laboratory Results

3.3.4.2.1 Metals

All groundwater samples collected as part of this 2010 investigation effort were submitted to the laboratory for total chromium and Cr⁺⁶ analyses. Unfiltered and filtered aliquots were collected from the vertical profiling points, whereas only unfiltered aliquots were collected from the piezometers and monitoring wells. As indicated in Table 3-9, total chromium (unfiltered aliquot) was detected in each of the depth intervals at each of the vertical profiling points. Total chromium concentrations ranged from 89.9 ppb in profile sample VP-19(20-24) to 6,100 ppb in profile sample VP-19(120-124). All of the reported concentrations except for that which was reported for sample VP-19(20-24) exceed the clean-up criterion and MCL of 100 ppb. The analysis of total chromium in the filtered aliquots yielded detections greater than the laboratory reporting limit in 13 of the 20 vertical profile samples. The filtered total chromium concentrations ranged from 10.7 ppb in vertical profile sample VP-16(20-24) to 4,600 ppb in sample VP-19(120-124). Nine of the 13 reported concentrations of total chromium in the filtered aliquots exceed the clean-up criterion and MCL. Cr⁺⁶ was detected in 10 of the 20 unfiltered vertical profile samples and in 10 of the 20 filtered vertical profile samples (although not in the same samples – refer to Table 3-9). The Cr⁺⁶ concentrations (unfiltered) ranged from 11 ppb in vertical profile sample VP-17(45-49) to 4,300 ppb in sample VP-19(120-124) and from 22 ppb

in filtered sample VP-18(70-74) to 4,300 ppb in filtered sample VP-19(120-124). A New Jersey GWQS, MCL or site-specific clean-up criterion has not been established for Cr⁺⁶.

As indicated above, four piezometers located on the car wash property were sampled as part of the 2010 investigation efforts. Total chromium was detected above the laboratory detection limits in one piezometer sample (A-S) at a concentration of 20.6 ppb. This reported concentration is below the clean-up criterion and MCL of 100 ppb. Cr⁺⁶ was also detected in groundwater sample A-S at a concentration of 42 ppb. A summary of the analytical results associated with the piezometer sampling is presented in Table 3-10.

As shown in Table 3-11, groundwater samples collected from newly-installed monitoring wells SC-37S and SC-38I yielded no concentrations of total chromium or Cr⁺⁶ above the laboratory reporting limits.

Although the newly installed permanent wells did not seem to identify the Wheaton Facility as a potential source of chromium, the temporary (VP) points identified some chromium. TRC may consider targeted investigations in this area at some point in the future.

3.3.4.2.2 Volatile Organic Compounds

All groundwater samples collected as part of the 2010 scope of work, including 20 vertical profiling samples, four piezometer samples and two monitoring well samples, were analyzed for VOCs. VOCs were detected in 15 of the 20 vertical profile intervals, in all four piezometer samples and in both monitoring well samples. VOCs detected during this phase of the investigation included: chloroform, 1,4-dichlorobenzene, 1,1-DCA, 1,1-DCE, 1,2-DCE, 1,1,1-TCA, TCE and PCE. Specifically, the TCE and PCE concentrations detected in the groundwater are discussed in greater detail below.

VOC TICs were not detected in any of the vertical profile groundwater samples, nor were they detected in the piezometer samples. They were, however, detected in both groundwater samples collected from monitoring wells SC-37S and SC-38I. Summaries of the VOC analytical results are provided in Tables 3-9 through 3-11.

3.3.4.2.3 TCE

TCE was detected in 11 of the 20 vertical profile samples ranging from an estimated concentration (“J”-qualified) of 0.25 ppb in sample VP-18(95-99) to 32.8 ppb in sample VP-

17(45-49). As shown in Table 3-9, the TCE concentrations reported for vertical groundwater profile samples VP-16(20-24), VP-16(45-49), VP-17(45-49), VP-18(45-49) and VP-19(45-49) exceed the New Jersey GWQS for TCE of 1 ppb and in VP-16(20-24), VP-17(45-49) and VP-18(45-49) for the MCL of 5 ppb.

The groundwater samples collected from two of the four piezometers exhibited concentrations of TCE above the laboratory reporting limits. Specifically, TCE was detected in groundwater samples A-S and A-D at concentrations of 4.8 ppb and 2.1 ppb, respectively. Both of these reported concentrations exceed the New Jersey GWQS of 1 ppb for TCE but not the MCL of 5 ppb.

TCE was also detected in the groundwater samples collected from monitoring wells SC-37S and SC-38I. Both groundwater samples exhibited TCE at a concentration of 2.2 ppb which exceeds the New Jersey GWQS but not the MCL.

3.3.4.2.4 PCE and other CVOCs

PCE was detected in all four piezometers sampled at the car wash property at concentrations ranging from 5.8 ppb in sample D-S to 114 ppb in sample A-S. The concentrations of PCE detected in all four piezometers exceed the New Jersey GWQS and MCL of 1 ppb and 5 ppb, respectively for PCE.

As indicated in the analytical summary tables, PCE was not detected above laboratory reporting limits in the vertical profile groundwater samples, nor was it detected in the groundwater samples collected from the two newly-installed monitoring wells during the November 4, 2010 sampling event. This information suggests that the PCE source area is the Fischer & Porter/Andrew Glass site as represented by Figure 3-5 which shows the PCE isopleth oriented directly towards that site.

Similar to the results reported for the 2009 investigation, the majority of the other CVOCs detected in the groundwater samples collected as part of this scope of work were detected intermittently and generally at low concentrations. The only other CVOC detected in the groundwater at concentrations in excess of its respective New Jersey GWQS (but not its MCL) was 1,1-DCE. As summarized in Table 3-9, 1,1-DCE was detected at concentrations of 3 ppb and 2.5 ppb in two vertical profile samples [VP-16(20-24) and VP-17(45-49), respectively]. It is noted that 1,1-DCE was a contaminant identified at the Wheaton Industries site.

3.3.4.2.5 Quality Assurance/Quality Control Samples

As stated in the notes associated with the monitoring well groundwater sample analytical results summary table (Table 3-11), the trip blank submitted to the laboratory as part of this sampling event did not exhibit detectable concentrations of VOCs.

4.0 DISCUSSION OF OU1 SUPPLEMENTAL RI FINDINGS

The primary objective of the OU1 Supplemental RI was to delineate the horizontal and vertical extent of the chromium and TCE plumes and to install sentinel wells, which was accomplished, as discussed in Section 4.1 below.

Low concentrations of TCE that exist somewhat beyond the pumping wells warranted some study regarding their fate and susceptibility to monitored natural attenuation (MNA), as discussed in Sections 4.2, 4.3 and 4.4 below.

A secondary, more recent objective of the OU1 Supplemental RI was to confirm or deny non-SMC contamination sources. This topic is discussed in Section 4.5

4.1 Plume Delineation

The analytical results of the OU1 Supplemental RI indicate that the extent of the VOC plume, specifically TCE, has been both horizontally and vertically delineated. TCE was not detected in vertical profile location VP-15A and the co-located monitoring (sentinel) well SC35D as well as VP-13A and the co-located monitoring (sentinel) well SC36D, which define the southwestern and northern limits of the VOC plume, respectively.

The plume is also defined vertically. The vertical extent of the TCE plume is confined to the intermediate and deep portions of the aquifer. Cross-sectional views of the TCE plume are shown in Figures 4-1 and 4-2. Along the center line of the TCE plume, running approximately southwest from the Farm Parcel towards VP-15A, the plume is generally confined between elevations of 40 - 60 feet above mean sea level (ftmsl) down to approximately 30 - 35 feet below mean sea level (i.e., the approximate elevation of the clay confining layer of the aquifer). Near the flanks of the plume (i.e., locations VP-13, VP-6 and VP-9A), the TCE is generally confined to the deepest depth intervals. Along the southern flank, the TCE appears to be confined to between approximately +20 and -35 ftmsl, at the clay layer. The northern flank, based on the VP-4 and VP-13 results, appears to be confined to between 40 ftmsl and the clay confining layer at approximately -25 ftmsl.

4.2 TCE Plume Initial Fate Analysis

TRC performed an initial TCE Plume Stability analysis which was a statistical assessment on the TCE concentrations of a number of monitoring wells located on or near the

Farm Parcel to determine the stability of the TCE plume (i.e., increasing, decreasing or no trend in historical TCE concentrations). The wells evaluated included: SC1D, SC5D, SC18D, SC24D, SC28D and SC31D. Data from these wells were statistically evaluated using the non-parametric Mann-Kendall Test and Mann-Whitney U Test to determine if concentrations of TCE are decreasing at these locations at a minimum 90 percent level of confidence. These statistical tests are considered to be appropriate for evaluating trends in the data for the following reasons:

- The tests are designed to handle data that are non-parametric (i.e., do not exhibit a specific distribution such as normal or log normal);
- The data set can contain data collected at irregularly spaced intervals in time; and
- The data set can contain elevated (outlier) values compared to the average or non-detect results without adversely affecting the outcome of the analysis.

The Mann-Kendall Test requires data from at least four sampling events. The Mann-Whitney U Test requires at least two years of quarterly data for comparison. Quarterly monitoring data from January 2004 through January 2010 was used for the statistical evaluation. The results of the evaluation are summarized below.

Monitoring Well	Trichloroethene	
	Mann-Kendall	Mann-Whitney
SC-1D	No Trend	No Trend
SC-3D	No Trend	No Trend
SC-5D	No Trend	No Trend
SC-18D	No Trend	Insufficient data to perform Mann-Whitney Test
SC-24D	Concentration is decreasing	Concentration is decreasing
SC-28D	No Trend	No Trend
SC-31D	No Trend	No Trend

The results of this evaluation clearly indicate that the concentrations of the TCE plume do not exhibit a statistical trend, or, in other words, the plume is stable (i.e., not increasing or decreasing) at each of these locations (except for SC24D where the TCE concentrations are decreasing).

Figure 4-3 represents the historical TCE trends of wells screened in the deep aquifer from on-site well A, to downgradient wells SC28D, SC5D, SC31D, SC24D and SC1D. As shown by these line graphs, the TCE plume has exhibited stability over the last four to ten years and has actually shown a downward trend in SC24D.

In fact, the TCE concentrations along the centerline of the groundwater flow pathway, downgradient of the Farm Parcel extraction well RIW2, decrease from 19 ppb at SC3D(R), to 7.1 ppb at SC1D (near the edge of the Farm Parcel, and approaching EPA's MCLs of 5 ppb), to non-detect at the sentinel well SC35D.

Furthermore, one of the major goals of the OU1 Supplemental RI of delineating the downgradient TCE plume has been achieved.

4.3 TCE Monitored Natural Attenuation Science

The discussion above indicates that the TCE downgradient of the Farm Parcel is stable. This is one of the benchmarks of monitored natural attenuation (MNA).

It is useful to understand the established science relative to MNA for TCE. Mechanisms facilitating the natural attenuation of organic compounds in groundwater include volatilization, sorption, dispersion, and biodegradation (EPA, 1998). Volatilization and sorption are mass transfer processes. In volatilization, the mass of a volatile compound in groundwater is reduced through the transfer of the compound from an aqueous phase into a vapor phase. This process takes place across the water table interface. Based upon a review of groundwater analytical data, TCE in the downgradient areas of interest is present in deeper groundwater but is generally absent or present only at very low concentrations in shallow groundwater. On this basis, volatilization does not appear to be a significant attenuation process for TCE in the areas of interest.

Similar to volatilization, sorption is a mass transfer process whereby a volatile organic compound (e.g., TCE) partitions from a dissolved aqueous phase onto organic carbon that is

present in the aquifer soils. Sorption is often expressed in terms of a linear isotherm model (i.e., Freundlich Isotherm) that is based upon the following equation (EPA, 1989):

$$K_d = C_s/C_w = K_{oc} * f_{oc}$$

Where: K_d = distribution coefficient (volume/mass);
 C_s = concentration of constituent of interest (mass/mass);
 C_w = concentration of constituent of interest in groundwater (mass/volume);
 K_{oc} = organic carbon partitioning coefficient (volume/mass) ;
 f_{oc} = fraction of organic carbon (dimensionless).

As indicated by the equation presented above, attenuation of dissolved contaminant mass through sorption is proportional to the amount of organic carbon present in a soil. A limited amount of information is available regarding organic carbon content of the sandy soils in the deeper portion of the aquifer (i.e., greater than 100 ftbgs) where groundwater impacts occur. Soil samples obtained from these depths at monitoring wells MWH-4 and SC-2D(R) and soil boring STSB-1, which are located in parts of the plume that are adjacent to the areas of interest, exhibit organic carbon contents ranging from 178 milligrams per kilogram (mg/kg) to 2,340 mg/kg (f_{oc} ranging from 0.0002 to 0.002). This f_{oc} is considered to be typical of sands (Walton, 1991) and indicates a low potential for significant sorption. It should be noted that mineral surfaces may play a role in sorption of organic compounds like TCE at these low f_{oc} values (Chiou et. al., 1985; Karickhoff, et.al., 1984).

Dispersion neither destroys nor reduces contaminant mass in the aqueous phase. Instead, dispersion acts as an attenuation mechanism by reducing concentrations of a constituent of interest in groundwater through diffusion and mechanical mixing that occurs as a result of variations in groundwater velocity at a macroscopic level.

Biodegradation is considered to be one of the more important mechanisms of natural attenuation of organic compounds such as TCE, since this process involves a reduction in contaminant mass. Biodegradation of TCE can occur under anaerobic, anoxic, or aerobic conditions (Lawrence, 2006). Depending upon the geochemical conditions in the aquifer, TCE may be used as an electron acceptor, electron donor or it can be co-metabolized. The following sections discuss these biodegradation mechanisms as described by Lawrence (2006).

Electron Acceptor Reactions (Reductive Dechlorination) - TCE is typically degraded under anaerobic and reducing conditions (i.e., low dissolved oxygen in the presence of a suitable electron donor with oxidation-reduction potentials (ORPs) typically <50 millivolts [mv]). This process is referred to as reductive dechlorination and is catalyzed by microorganisms in which a chlorine atom is removed and replaced with a hydrogen atom. The sequential biodegradation of TCE can be summarized as follows:



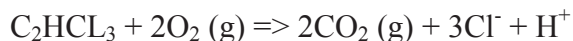
As indicated by the reaction pathway shown above, an increase in daughter compounds (i.e., 1,2-DCE, 1,1-dichloroethene [1,1-DCE], vinyl chloride [VC], ethene, and/or ethane) and an increase in the concentration of chloride ions, could indicate that reductive dechlorination is occurring. During sequential reductive dechlorination of TCE to ethane, one mole of daughter compound is produced for each mole of parent product degraded.

It should be noted that this sequence of biodegradation may be interrupted under anoxic or anaerobic conditions by another process (i.e., anaerobic direct metabolism) where 1,2-DCE and/or VC may be directly metabolized by microorganisms to carbon dioxide (CO₂). On this basis, an increase in dissolved CO₂ or alkalinity along a flow path may be observed if 1,2-DCE and/or VC are being directly metabolized. Based upon stoichiometry, approximately two moles of CO₂ are produced for every mole of 1,2-DCE or VC degraded. Since CO₂ can form weak carbonic acid, which dissolves calcite minerals and contributes to alkalinity, alkalinity can serve as a surrogate indicator of the production of carbon dioxide during biodegradation.

Reductive dechlorination is mediated by electron acceptors which can include nitrate, ferric iron (Fe⁺²), sulfate, and/or CO₂ (EPA, 1998). As each electron acceptor is utilized, it is converted to its reduced form (e.g., nitrate to nitrite, ferric iron to ferrous iron, sulfate to hydrogen sulfide, and CO₂ to methane). Thus, a reduction in the electron acceptor concentrations along a flow path and/or the presence or accumulation of the corresponding reduced species can also indicate that reductive dechlorination is occurring.

Aerobic Reactions - Under aerobic conditions, the biodegradation of TCE does not produce dichloroethenes, VC, ethene or ethane. Instead, TCE may be degraded along three different pathways by different microorganisms. Each degradation pathway yields different intermediates (i.e., chloral hydrate, trichloroacetate, trichloroethanol, trichloroethene epoxide,

formate, dichloroacetate, or carbon monoxide) and one of the following end products: CO₂, oxalate, or glyoxylate. In its simplest form, the aerobic biodegradation of TCE to CO₂ can be stoichiometrically expressed as follows:



Based upon this equation, for every mole of TCE biodegraded, 2 moles of carbon dioxide and three moles of chloride would be produced. On this basis, aerobic biodegradation of TCE could be indicated by increases in CO₂, alkalinity, and chloride. It should be recognized, however, that when dealing with low concentrations of TCE, the concentrations of CO₂ and chloride produced during biodegradation will be small and may not be perceptible given the sensitivity of standard laboratory analytical methods and potential variability of background concentrations. For example, the aerobic biodegradation of 15 µg/l of TCE would, based upon the stoichiometric equation presented above, theoretically produce approximately 10 µg/l of CO₂ and approximately 12 µg/l of chloride. Given that typical detection limits for chloride and CO₂ are measured in mg/l, an increase in chloride or CO₂ of this magnitude may not be noticeable given the sensitivity and accuracy of the analytical method.

Cometabolism - Cometabolism describes the dechlorination of TCE catalyzed by an enzyme or co-factor produced by the bacteria for cellular metabolism. During cometabolism, the TCE is indirectly transformed by bacteria as they use another substrate (e.g., methane) to meet their energy requirements. Therefore, other sources of carbon and energy are needed to maintain bacterial activity. Lawrence (2006) notes that cometabolic degradation of TCE under aerobic conditions tends to be limited to low concentrations in the µg/l range because higher concentrations in the mg/l range inhibit microbes that facilitate cometabolic biodegradation reactions. On this basis, reductions in naturally occurring or anthropogenic sources of organic carbon along a flow path accompanied by a reduction in TCE could be evidence of cometabolic biodegradation of TCE.

4.4 MNA of TCE on Downgradient Farm Parcel

Based upon our analysis, processes that potentially affect the attenuation of TCE in deep groundwater beneath the Farm Parcel include biodegradation, sorption, and dispersion. Biodegradation of TCE can potentially occur under anaerobic or aerobic conditions via reductive

dechlorination (anaerobic conditions) and cometabolic pathways (anaerobic, anoxic and oxic [aerobic] conditions).

Dissolved oxygen concentrations measured in groundwater at monitoring wells SC-1D, SC-3D(R), and SC-24D using a flow cell during monitoring events conducted in October 2006 and in January 2010 ranged from 0.57 mg/l at well SC-3D(R) during January 2010 to 9.51 mg/l at well SC-1D during October 2006. The concentration of dissolved oxygen measured in wells SC-1D and SC-3D(R) was less than 1 mg/l during the January 2010 monitoring event and greater than 5 mg/l during the October 2006 monitoring event. These dissolved oxygen concentrations are considered to be representative of anoxic conditions at the low end and oxic (aerobic) conditions at the higher end.

Redox potentials measured in groundwater at locations SC-1D, SC-3D(R) and at SC-24D during October 2006 and January 2010 using a silver/silver chloride (Ag/AgCl) with 3.33 moles/l potassium chloride (KCl) reference electrode ranged from 164 mv to 411 mv and are considered to be representative of oxidizing conditions. According to Weidemeier et. al. (1998), dissolved oxygen concentrations >0.5 mg/l and ORPs >50 mv will generally suppress reductive dechlorination biodegradation pathways that could occur under anoxic conditions. Weidemeier also notes that when sulfate concentrations exceed 20 mg/l, sulfate-reducing bacteria may compete with bacteria that facilitate reductive dechlorination, thus inhibiting biodegradation of TCE through reductive pathways.

Sulfate concentrations detected in monitoring wells SC-1D, SC-3D(R), and SC-24D have generally exceeded 50 mg/l for the past two years and have been increasing in these wells. On this basis, it appears that biodegradation, if occurring beneath the Farm Parcel, would be through aerobic mechanisms (i.e., aerobic cometabolism).

CO₂ is one by-product that is produced during aerobic biodegradation of TCE. Therefore, an increase in CO₂, alkalinity or chloride and/or decrease in dissolved oxygen along a flow path could be indicative of aerobic biodegradation of TCE. A flow path is interpreted to exist between wells SC-3D(R) and SC-1D. Samples collected from these monitoring wells during October 2006 were analyzed for alkalinity, chloride and dissolved oxygen. Based upon results for these analytes, the dissolved oxygen concentration increased and chloride concentrations decreased along the flow path between these monitoring wells. Alkalinity was higher at downgradient well SC1D relative to SC-3D(R).

Based upon these data and information presented earlier, the mechanisms for attenuation of TCE in deep groundwater beneath the Farm Parcel that are occurring the fastest appears to be dispersion and flushing, which are viable mechanisms. Biodegradation at the Farm Parcel is a slower process.

Because the TCE is stable, and the other analyses, we believe that natural attenuation is occurring and warrants additional consideration.

4.5 Non-SMC Source Discussion

The following facts have been outlined relative to non-SMC sources in the area:

1. The NJDEP has already identified known and suspected sources and potentially responsible parties in the area.
2. TCE trends over time are indicative of a non-SMC source.
3. The broad nature of the VOC plume is indicative of multiple and widespread sources.
4. PCE has been historically detected in low concentrations upgradient of SMC. PCE has not been detected in SMC facility wells located downgradient of past manufacturing areas. PCE concentrations just downgradient of the SMC facility have been identified in 2002, 2006, 2009 and 2010 OU1 Supplement RI studies at concentrations ranging from 5 ppb to 114 ppb which exceed the New Jersey GWQS and MCL, representing a “spike” in PCE associated with non-SMC sources.

These points are discussed in detail below.

As discussed in detail in Section 2.3.4, the NJDEP documented that multiple non-SMC sources exist (north and west of the car wash).

As discussed in below, the broad geographic scope of delineation activities has identified a solvent plume that is of such a shape and size to indicate regional conditions. The portions of this plume upgradient and side gradient to SMC cannot be attributed to SMC.

In the vicinity of and downgradient of the car wash, several monitoring wells have exhibited somewhat of an upward trend in the TCE concentration over the past several years including SC6D, IW2, SC3D(R) and SC31D (Figure 4-7). The deep well SC6D located at the car wash has exhibited a slight upward trend of TCE (from less than 5 ppb to approximately 10 ppb) since the beginning of 2005. Moving downgradient to intermediate aquifer well IW2 located on the Farm Parcel, TCE exhibited a fairly significant increase in early 2003 (from less

than 10 ppb to greater than 20 ppb for a majority of the sampling events since then). Deep well SC3D(R) has shown a slow but steady increase in TCE (from less than 5 ppb to approximately 20 ppb) since about 2003. Deep well SC31D exhibited a notable increase in TCE during 2005 (from less than 5 ppb to approximately 20 ppb) but then decreased to approximately 10 ppb and has remained fairly stable since then. It is suspected that these upward trends in TCE may likely be related to the non-SMC sources

PCE, a constituent not used by SMC and not contributed by SMC, is present at significant concentrations in the area. First, in background wells PCE at low concentrations (1 ppb), indicative of a background/area condition exists. Second, PCE concentrations jump immediately downgradient of the SMC facility to concentrations of 114 ppb in a shallow piezometer at the car wash. It should be noted that, both TCE and PCE have been detected in Farm Parcel wells SC5D, SC24D, SC2D(R) and SC31D. TCE is a first order breakdown by-product of PCE. Due to the fact that PCE was not historically used in the manufacturing processes at the SMC facility and has never been detected in SMC facility wells located downgradient of manufacturing processing areas, and the close proximity of the Farm Parcel wells to other known industrial facilities (e.g., Wheaton Industries/Galena Lead Crystal, Fischer & Porter/Andrews Glass, Research Glass, etc.) that have or are currently being investigated by the NJDEP for chlorinated VOC contamination, the potential exists for the downgradient PCE and TCE contamination to be originating from source area(s) upgradient of the Farm Parcel but downgradient of the SMC facility.

In addition, the results of the 2006/2007 OU1 Supplemental RI indicated the presence of PCE in the deep portion of the aquifer as far as one mile downgradient of the Farm Parcel. PCE isopleth maps for the shallow, intermediate and deep portions of the aquifer are presented in Figures 4-4/3-2, 4-5 and 4-6, respectively. It is evident from the figures that PCE is present throughout all depths of the aquifer and appears to be located in two general areas including southwest and southeast of the SMC Site.

The area southwest of the Site represents the most significant PCE plume which extends from the general car wash area towards the west-southwest for nearly one and a half (1.5) miles. The highest PCE concentrations are found in the shallow aquifer in the car wash area (114 ppb) and in the deep aquifer at the downgradient VP-3 location (38.6 ppb in the 95-100 ftbgs interval). The shallow plume in the car wash area, as shown on Figure 3-2, appears to originate from the

Fischer & Porter/Andrews Glass site. The PCE plume located southeast of the SMC facility is much smaller in areal extent, consists of much lower concentrations (maximum of 1.1 ppb) and appears to be originating from an unknown source located east of the SMC facility. Once again, this is a strong indication that other potential source area(s) not associated with SMC are contributing to the off-site VOC contaminant plume.

The results of TRC's investigation around the Car Wash indicated the presence of TCE, PCE and other chlorinated VOCs in the groundwater. The concentrations of PCE detected ranged between 5.8 ppb and 114 ppb and TCE ranged between 0.25 ppb and 32.8 ppb. The highest concentrations of PCE and TCE detected were in the shallow portion of the aquifer (between the water table and 49 ftbgs) strongly suggestive of a nearby source area(s).

4.6 Chromium

The OU1 Supplemental RI results indicate that the horizontal and vertical extents of the total chromium plume have been delineated. Chromium concentrations detected in several of the vertical profiles located downgradient of the Farm Parcel extraction well RIW2 and screened within each aquifer depth (i.e., shallow, intermediate, and deep) were below clean-up criteria. This indicates that RIW2 has effectively contained the chromium plume.

It is noted that the horizontal extent of a portion of the chromium plume is irregular in shape in one area, but that delineation has been achieved. A "lobe" of the plume appears to extend to the south of the Site, across the Lacroce property, as indicated in Figure 2-9. It is possible that significant former or current groundwater diversions (e.g., municipal wells, irrigation wells, etc.) may have influenced the plume in the deep portion of the aquifer.

Certain temporary, vertical profiling points, detected some chromium, but this is generally attributed to the turbidity associated with temporary wells. According to the geochemistry of the aquifer (i.e., Eh and pH), groundwater is under reducing conditions, which is favorable to natural attenuation.

4.7 Data Gaps

Following completion of the 2009/2010 OU1 Supplemental RI, no significant data gaps exist for the Site regarding the delineation of chromium and TCE contaminated groundwater. A robust monitoring well network is in place, extending more than two miles downgradient of the

Site, which defines the horizontal and vertical extents of chromium and TCE impacts. Semi-annual sampling is currently conducted on a large majority of these wells to continue to track groundwater contaminant concentrations and trends. The identified contaminant plumes are at or near steady state as a result of active groundwater pumping and treatment and natural degradation and/or reduction of the respective plumes. The identified chromium and TCE plumes are entirely within defined well-use restriction areas, and as such, exposure risks associated with the deep plumes are very low.

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 Plume Delineation

5.1.1 Defined Plume Extent

The field and analytical data developed during the OU1 Supplemental RI has delineated the chromium and TCE plumes both horizontally and vertically.

The results of the downgradient sentinel wells (SC35D and SC36D) installed during November 2009, demonstrated the absence of VOCs and chromium. Subsequent sampling of these wells during January, April and October 2010 confirmed this finding and provide new sentinel well locations (SC35D and SC36D).

5.1.2 Non-SMC Source Identification

TRC has determined that there are non-SMC sources to the plume in the area, as supported by the following conclusions:

1. The NJDEP documented that non-SMC sources exist (north and west of the car wash).
2. TCE concentrations in groundwater demonstrate an uptick overtime, downgradient of the identified non-SMC locations near Weymouth Road and South West Boulevard.
3. The broad geographic scope of delineation activities has identified a solvent plume that is of such a shape and size to indicate regional conditions. The portions of this plume upgradient and sidegradient to SMC cannot be attributed to SMC.
4. PCE, a constituent not contributed by SMC, is present at significant concentrations in the area. First, in background wells PCE as low concentrations (1 ppb), indicative of a background/area condition exists. Second, PCE concentrations jump immediately downgradient of the SMC facility to concentrations of 114 ppb. A broad PCE plume exists (over 1 mile from the North Vineland Groundwater contamination area).

It is clear that the PCE is from non-SMC sources, and, generally, that VOC's south of Weymouth Road and west of South West Boulevard are impacted by non-SMC sources. It is believed that at least some of the TCE present southwest of the Farm Parcel is also attributable to these non-SMC sources.

5.2 Recommendations

TRC recommends the following:

1. Site activities should focus on expediting OU1 remediation. Delineation of the chromium and TCE plumes are complete.
2. The government has already acknowledged the existence of other potentially responsible parties (and non-SMC contamination). Our investigations have demonstrated that the VOC plume west of South West Boulevard and south of Weymouth is impacted by non-SMC VOC contamination. TRC cannot be made liable for non-SMC contributions to OU1. The government may or may not choose to take steps against non-SMC PRPs.
3. Monitored natural attenuation should be further considered for the TCE downgradient of the Farm Parcel pumping well (RIW2). The TCE concentrations downgradient of the Farm Parcel pumping well are low (generally less than 20 ppb), decrease along the plume centerline to non-detect, are stable, exhibit conditions generally favorable to MNA, exist in an area where public water is required by a well restriction area, and are likely the result of non-SMC contributions to the plume.

6.0 REFERENCES

Bill Kennedy, Vineland Water Company, Personal Communication with Meg Winfield of TRC, March 2006.

Chiou, C.T., T.D. Shoup, and P.E. Porter, 1985. "*Mechanistic Roles of Soil Humus and Minerals in the Sorption of Nonionic Organic Chemicals from Aqueous and Organic Solutions.*" Organic Geochemistry, Volume 8. pp. 9-14.

EDR, 2007. The EDR Radius Map with GeoCheck®, Shieldalloy Metallurgical Corp., 35 South West Blvd., Newfield, NJ 08344. March 9, 2007.

ERT, 1988. Historic VOC Usage at the SMC Newfield, New Jersey Facility. September 2, 1988.

HACH, 2003. DR/4000 Spectrophotometer Procedures Manual, 11th Ed., June 2003.

HACH, 2004. DR/4000 Spectrophotometer Users Manual, 3rd Ed., August 2004.

Karickhoff, S.W. 1984. *Organic pollutant sorption in aquatic systems.* J. Hydraul. Eng. Div. Am. Soc. Civ. Eng. 110:707–735.

Lawrence, S.J., 2006. Descriptions, Properties, and Degradation of Selected Volatile Organic Compounds Detected in Groundwater – A Review of Selected Literature. United States Geological Survey Open File Report 2006-1338.

New Jersey Administrative Code (N.J.A.C. 7:9-6), Ground Water Quality Standards, January 1993.

New Jersey Administrative Code (N.J.A.C. 7:9B), Surface Water Quality Standards, April 1998.

New Jersey Administrative Code (N.J.A.C. 7:9D), Well Construction; Maintenance and Sealing of Abandoned Wells, September 2001.

NJDEP, 2005. Field Sampling Procedures Manual, September 2005.

NJDEP, 2006. Administrative Consent Order PI# 000297, March 2006.

TRC, 1992. Remedial Investigation Technical Report, 1992.

TRC, 1994. Final Focused Feasibility Study (Groundwater), 1994.

TRC, 1999. Lagoon Closure Report, December 1999.

TRC, 2000. Draft Final Work Plan Off-Site Ground Water Investigation, 2000.

TRC, 2001. Classification Exception Area Information, April 2001.

TRC, 2004. Draft Report - Off-Site Ground Water Investigation, June 2002 - July 2003, February 2004.

TRC, 2005a. Phase I Environmental Site Assessment and Environmental Compliance Summary, August 2005.

TRC, 2005b. Ground Water Sampling and Analysis Plan – RCRA Monitoring Wells. December, 2005.

TRC, 2006. Draft Final Supplemental Off-Site Ground Water Investigation Work Plan. October 2006.

TRC, 2007. Draft Ground Water Operable Unit 1 (OU1) Design Report. February 2007.

TRC, 2008. Phase II Supplemental Off-Site Ground Water Investigation Work Plan. August 2008.

TRC, 2010a. OU1 Sampling Event Notification. Letter from TRC to USEPA, September 1, 2010.

TRC, 2010b. OU1 Well Installation Event Notification. Letter from TRC to USEPA, October 18, 2010.

TRC, 2010c. OU1 Remedial System Optimization Study. Letter report to USEPA, November 15, 2010.

U.S. Environmental Protection Agency, 1989. Seminar Publication: Transport and Fate of Contaminants in the Subsurface. EPA/625/4-89/019. September 1989.

U.S. Environmental Protection Agency, 1998. Technical Protocol for Evaluating Natural Attenuation of Chlorinated Solvents in Groundwater. EPA/600/R-98/128. Contributing Authors: T.H. Wiedemeier, M.A. Swanson, D.E. Moutoux, and K. Gordon (Parsons Engineering Science, Inc.); J.T. Wilson, B. H. Wilson, and D.H. Kambell (U.S. EPA); P.E. Haas, R.N. Miller, and J.E. Hansen (AFCEE); and F.H. Chapelle (USGS).

Walton, W.C., 1991. Principles of Groundwater Engineering. Lewis Publishers, CRC Press, Boca Raton, Florida.

Wiedemeier, T.H., M.A. Swanson, D.E. Moutoux, E.K. Gordon, J.T. Wilson, B.H. Wilson, D.H. Kambell, P.E. Haas, R.N. Miller, J.E. Hansen, and F.E. Chapelle, 1998. *Technical Protocol for Evaluating Natural Attenuation of Chlorinated Solvents in Groundwater*. United States Department of Environmental Protection National Risk Management Research Laboratory, Cincinnati, Ohio.

TABLE 3-1
VERTICAL GROUNDWATER PROFILING LOG
OU1 Supplemental RI
Shieldalloy Metallurgical Corporation
Newfield, New Jersey

Vertical Ground Water Profiling Location	Sample Date	Depth Interval (ftbgs)	Approximate Pumping Rate (gpm)	Approximate Purge Volume (gallons)	Drill Cuttings Description	Purge Water Description	Notes
VP-13	10/14/2009	25-30	1.0	30	Orange-brown F-M SAND, some c-gravel.	Orange-brown silty, then clearing.	Depth to water is approximately 26 ftbgs. Used whale pump to purge and collect groundwater sample.
	10/14/2009	50-55	3.2	100	Orange-brown F-C SAND, little silt, trace f-gravel.	Orange-brown silty, then clearing.	
	10/14/2009	75-80	5.4	70	Orange-brown F-C SAND, little silt, trace f-gravel.	Slightly orange-brown silty, then clearing.	
	10/15/2009	100-105	2.3	100	Orange-brown F-C SAND, little silt, trace f-gravel.	Orange-brown silty, then clearing.	
	10/15/2009	125-130	2.5	100	Orange-brown F-C SAND, little silt, trace f-gravel.	Orange-brown silty, then clearing.	Driller noted slight auger resistance between 128 and 129 ftbgs.
VP-13A	10/22/2009	15-20	1.4	50	Orange-brown M-C SAND, trace f-m gravel.	Orange-brown silty, then clearing.	Depth to water is approximately 15 ftbgs. Siphoned and poured approx. 21 gallons of clean water into boring to clear fines from SAT.
	10/22/2009	37-42	7.3	80	Orange-brown M-C SAND, trace f-m gravel.	Orange-brown silty, then clearing.	
	10/22/2009	62-67	1.6	70	Orange-brown F-M SAND, little c-sand, trace silt.	Orange-brown silty, then clearing.	
	10/23/2009	87-92	5.2	125	Orange-brown F-M SAND, little c-sand, trace silt.	Orange-brown silty, then clearing.	
	10/23/2009	111-116	3.8	75	Orange-brown F-M SAND, little c-sand, trace silt.	Orange-brown silty, then clearing.	

**TABLE 3-1
VERTICAL GROUNDWATER PROFILING LOG**

OU1 Supplemental RI
Shieldalloy Metallurgical Corporation
Newfield, New Jersey

Vertical Ground Water Profiling Location	Sample Date	Depth Interval (ftbgs)	Approximate Pumping Rate (gpm)	Approximate Purge Volume (gallons)	Drill Cuttings Description	Purge Water Description	Notes
VP-14	10/16/2009	35-40	1.1	75	Orange-brown F-C SAND, little m-c gravel, trace silt.	Orange-brown silty, then clearing.	Augered to 35 ftbgs and 0.4' water inside auger. Augered to 40 ftbgs but water not entering auger. Pour clean water inside auger. Used whale pump to purge and collect groundwater sample.
	10/16/2009	55-60	2.2	50	Brown VF-M SAND, trace silt.	Orange-brown silty, then clearing.	
	10/19/2009	80-85	2.6	115	Brown VF-M SAND, trace silt.	Orange-brown silty, then clearing.	YSI multi-parameter probe not functioning.
	10/19/2009	105-110	2.8	80	Brown VF-M SAND, trace silt.	Orange-brown silty, then clearing.	YSI multi-parameter probe not functioning.
	10/19/2009	130-135	3.7	100	Brown VF-M SAND, trace silt.	Orange-brown silty, then clearing.	
VP-15	10/12/2009	30-35	3.4	75	Orange-brown F-M SAND, some silt, trace m-gravel.	Yellow-brown to pale yellow.	Depth to water is approximately 27.2-ftbgs.
	10/12/2009	45-50	6.3	50	Orange-brown F-M SAND, some silt, some m-c gravel.	Orange-brown then clearing.	
	10/13/2009	65-70	3.6	50	Orange-brown F-C SAND, little silt, trace f-m gravel.	Yellow-brown then clearing.	
	10/13/2009	88-93	7.1	100	Orange-brown F-C SAND, little silt.	Yellow-brown then clearing.	
	10/13/2009	114-119	2.2	50	Orange-brown F-C SAND, little silt.	Gray and silty, then clearing.	Driller noted slight auger resistance near bottom of boring. Gray clay smeared on bottom half of lead auger.

TABLE 3-1
VERTICAL GROUNDWATER PROFILING LOG

OU1 Supplemental RI
Shieldalloy Metallurgical Corporation
Newfield, New Jersey

Vertical Ground Water Profiling Location	Sample Date	Depth Interval (ftbgs)	Approximate Pumping Rate (gpm)	Approximate Purge Volume (gallons)	Drill Cuttings Description	Purge Water Description	Notes
VP-15A	10/20/2009	15-20	1.5	50	Light Tan F-M SAND.	Orange-brown silty, then clearing.	Used whale pump to purge and collect groundwater sample.
	10/21/2009	38-43	7.1	100	Brown SILTY CLAY.	Orange-brown silty, then clearing.	Augered to 38 ftbgs but only pumping small volume of brown-gray silty water. Added clean water to boring. Augered to 43 ftbgs next day.
	10/21/2009	55-60	3.6	125	Light Brown M-C SAND, trace f-gravel.	Orange-brown silty, then clearing.	Driller noted augers were chattering between 50 and 55 ftbgs, possibly indicating gravel layer.
	10/21/2009	77-82	4.5	50	Light Brown M-C SAND, trace f-gravel.	Orange-brown silty, then clearing.	Driller noted that formation was tight between 60 and 70 ftbgs.
	10/21/2009	99-104	7.9	110	Light Brown M-C SAND, trace f-gravel.	Orange-brown silty, then clearing.	Trace amount of gray clay observed on teeth of lead auger after removal from boring.

Notes:

ftbgs - feet below ground surface.

gpm - gallons per minute.

TABLE 3-2
VERTICAL GROUNDWATER PROFILING WATER QUALITY INDICATOR PARAMETERS
 2006-2007 OU1 Supplemental RI
 Shieldalloy Metallurgical Corporation
 Newfield, New Jersey

Sample ID	Date Analyzed	Sample Depth (ftbgs)	Temperature (°C)	pH	Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	Turbidity (NTU)	ORP (mV)	TDS (g/L)
VP-1 (15-20)	11/29/2006	15-20	21.90	5.36	0.165	2.64	62.2	163	0.11
VP-1 (35-40)	11/28/2006	35-40	19.40	5.54	0.081	4.82	192	142	0.05
VP-1 (60-65)	11/29/2006	60-65	16.40	5.38	0.107	5.00	501	179	0.07
VP-1 (85-90)	11/29/2006	85-90	15.20	5.25	0.051	8.28	91	225	0.03
VP-1 (105-110)	11/29/2006	105-110	15.60	5.27	0.038	4.28	37.8	183	0.02
VP-2 (15-20)	11/30/2006	15-20	7.14	6.09	0.145	7.14	189	168	0.09
VP-2 (35-40)	12/4/2006	35-40	15.50	5.46	0.115	1.00	57.7	190	0.07
VP-2 (60-65)	12/1/2006	60-65	15.30	5.78	0.290	2.02	42.3	146	0.19
VP-2 (85-90)	12/1/2006	85-90	15.70	5.45	0.181	2.31	67.4	164	0.12
VP-2 (110-115)	12/4/2006	110-115	17.00	6.08	0.097	10.64	889	64	0.06
VP-3 (25-30)	12/4/2006	25-30	13.10	3.27	0.124	11.12	453	188	0.08
VP-3 (45-50)	12/5/2006	45-50	16.29	4.55	0.591	4.87	188	166	0.38
VP-3 (70-75)	12/6/2006	70-75	14.83	4.37	0.461	3.88	184	95	0.30
VP-3 (95-100)	12/6/2006	95-100	16.31	4.56	0.398	4.09	88.6	82	0.33
VP-3 (115-120)	12/6/2006	115-120	12.44	4.31	0.509	4.25	58	96	0.33
VP-4 (30-35)	12/11/2006	30-35	17.10	4.84	0.306	4.50	121	247	0.20
VP-4 (50-55)	12/11/2006	50-55	16.20	5.11	0.260	9.20	239	230	0.17
VP-4 (75-80)	12/11/2006	75-80	15.90	5.47	0.138	5.33	17.4	186	0.09
VP-4 (100-105)	12/11/2006	100-105	15.60	5.83	0.100	5.44	272	141	0.06
VP-4 (121-126)	12/11/2006	121-126	15.40	5.63	0.132	6.03	46.8	158	0.09
VP-5 (25-30)	12/4/2006	25-30	18.70	5.55	0.072	6.08	260	192	0.05
VP-5 (45-50)	12/5/2006	45-50	15.50	5.46	0.115	1.00	57.7	190	0.07
VP-5 (65-70)	12/5/2006	65-70	15.30	5.78	0.290	2.02	42.3	146	0.19
VP-5 (95-100)	12/5/2006	95-100	14.00	5.08	0.099	10.29	21.1	255	0.06
VP-5 (120-125)	12/5/2006	120-125	14.50	5.10	0.106	9.58	8.6	251	0.07
VP-6 (20-25)	12/7/2006	20-25	17.60	5.36	0.075	1.00	437	66	0.05
VP-6 (40-45)	12/7/2006	40-45	15.40	5.13	0.225	3.01	97.9	207	0.15
VP-6 (60-65)	12/7/2006	60-65	15.00	5.20	0.137	4.88	50.4	207	0.09
VP-6 (90-95)	12/7/2006	90-95	15.00	5.15	0.083	5.20	144	199	0.05
VP-6 (115-120)	12/7/2006	115-120	14.90	5.18	0.037	6.78	138	211	0.02
VP-7 (30-35)	12/12/2006	30-35	21.81	4.26	0.075	7.57	361	130	0.05
VP-7 (55-60)	12/12/2006	55-60	17.13	4.15	0.257	6.30	220	126	0.17
VP-7 (85-90)	12/12/2006	85-90	14.06	4.14	0.071	9.47	249	153	0.05
VP-7 (115-120)	12/12/2006	115-120	13.68	4.11	0.065	7.52	146	166	0.04
VP-7 (140-145)	12/12/2006	140-145	13.85	4.13	0.071	8.08	0	159	0.05
VP-8 (25-30)	12/7/2006	25-30	23.44	4.19	0.163	5.98	218	125	0.11
VP-8 (50-55)	12/8/2006	50-55	19.58	4.34	0.130	8.90	384	106	0.09
VP-8 (80-85)	12/8/2006	80-85	13.60	4.77	0.920	4.11	284	51	0.59
VP-8 (110-115)	12/11/2006	110-115	17.16	4.41	0.960	3.27	151	68	0.60
VP-8 (135-140)	12/11/2006	135-140	20.77	4.25	0.584	3.59	232	125	0.37

TABLE 3-2
VERTICAL GROUNDWATER PROFILING WATER QUALITY INDICATOR PARAMETERS
2006-2007 OU1 Supplemental RI
Shieldalloy Metallurgical Corporation
Newfield, New Jersey

Sample ID	Date Analyzed	Sample Depth (ftbgs)	Temperature (°C)	pH	Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	Turbidity (NTU)	ORP (mV)	TDS (g/L)
VP-9 (30-35)	12/13/2006	30-35	15.78	4.48	0.176	5.50	94.2	118	0.11
VP-9 (55-60)	12/13/2006	55-60	17.10	5.19	0.086	3.79	593	193	0.06
VP-9 (85-90)	12/13/2006	85-90	12.90	4.98	0.040	6.94	77.8	261	0.03
VP-9 (115-120)	12/13/2006	115-120	13.70	4.98	0.940	8.33	5.3	229	0.06
VP-9 (140-145)	12/13/2006	140-145	14.70	5.23	0.054	6.77	140	200	0.04
VP-9A (20-25)	12/12/2006	20-25	18.60	5.05	0.118	8.18	119	229	0.08
VP-9A (45-50)	12/13/2006	45-50	18.00	5.19	0.332	5.44	332	185	0.21
VP-9A (70-75)	12/13/2006	70-75	16.30	4.91	0.136	6.98	24	244	0.09
VP-9A (100-105)	12/13/2006	100-105	15.60	5.78	0.169	6.72	38.7	128	0.11
VP-9A (130-135)	12/13/2006	130-135	14.70	5.36	0.062	6.72	79.1	189	0.04
VP-10 (20-25)	12/15/2006	20-25	20.30	4.71	0.481	7.88	148	261	0.31
VP-10 (35-40)	12/15/2006	35-40	18.20	4.85	0.360	4.92	178	245	0.23
VP-10 (60-65)	12/18/2006	60-65	16.90	5.33	0.091	2.30	740	173	0.06
VP-10 (85-90)	12/18/2006	85-90	16.20	5.12	0.115	4.49	0	214	0.07
VP-10 (109-114)	12/18/2006	109-114	15.90	4.99	0.044	2.93	0	217	0.03
VP-11 (35-40)	1/2/2007	35-40	17.50	4.67	0.182	16.72	16	274	NM
VP-11 (55-60)	1/3/2007	55-60	14.27	4.80	0.279	16.61	0	228	NM
VP-11 (85-90)	1/3/2007	85-90	12.99	4.90	0.053	17.65	180	235	NM
VP-11 (115-120)	1/3/2007	115-120	15.24	5.15	0.044	17.47	7	216	NM
VP-11 (142-147)	1/3/2007	142-147	13.39	5.05	0.039	12.81	190	203	NM
VP-12 (25-30)	1/4/2007	25-30	17.56	4.61	0.047	11.44	0	256	NM
VP-12 (55-60)	1/4/2007	55-60	16.92	4.81	0.045	10.48	220	233	NM
VP-12 (80-85)	1/4/2007	80-85	15.20	4.70	0.113	10.45	320	242	NM
VP-12 (110-115)	1/5/2007	110-115	14.69	4.78	0.051	10.96	0	238	NM
VP-12 (140-145)	1/5/2007	140-145	14.10	4.80	0.028	10.72	26	243	NM
Minimum			7.14	3.27	0.028	1.00	0	51	0.02
Maximum			23.44	6.09	0.960	17.65	889	274	0.60
Average			16.00	4.59	0.199	6.84	167	182	0.13
Standard Deviation			2.52	0.54	0.214	3.89	178	56	0.13

Notes:

All vertical profiling samples collected via a screened auger tool equipped with a packer/submersible pump assembly.

Temperature, pH, conductivity, DO, turbidity and ORP determined with a Horiba U-22XD multi-parameter meter installed in a flow-through cell.

Shaded results - Indicate ORP value is considered approximate due to the discovery that one of the ORP meters was not operating

properly; consequently a second ORP meter was subsequently used to measure the ORP in archived samples.

NM - Not Measured

ORP - Oxidation-reduction potential

TDS - Total dissolved solids

ftbgs - feet below ground surface

°C - Degrees Celsius

mS/cm - MilliSiemens per centimeter

mg/L - Milligrams per liter (parts per million)

NTU - nephelometric turbidity units

mV - Millivolts

g/L - Grams per liter

TABLE 3-2
VERTICAL GROUNDWATER PROFILING WATER QUALITY INDICATOR PARAMETERS

2009 OU1 Supplemental RI
Shieldalloy Metallurgical Corporation
Newfield, New Jersey

Sample ID	Date Analyzed	Sample Depth (ftbgs)	Temperature (°C)	pH	Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	Turbidity (NTU)	ORP (mV)	Alkalinity (mg/L)
VP-13 (25-30)	10/14/2009	25-30	12.82	4.31	0.153	8.59	57.3	302.3	50
VP-13 (50-55)	10/14/2009	50-55	13.44	4.65	0.175	2.17	46.9	277.6	10
VP-13 (75-80)	10/14/2009	75-80	14.16	4.41	0.125	7.50	8.2	287.0	10
VP-13 (100-105)	10/15/2009	100-105	13.99	4.68	0.113	8.20	35.4	252.4	10
VP-13 (125-130)	10/15/2009	125-130	14.16	5.05	0.033	8.44	15.1	235.6	10
VP-13A (15-20)	10/22/2009	15-20	19.17	4.73	0.462	0.43	44.2	205.2	10
VP-13A (37-42)	10/22/2009	37-42	14.50	4.42	0.182	0.23	32.8	213.9	10
VP-13A (62-67)	10/22/2009	62-67	16.44	4.80	0.148	0.29	3.7	174.7	15
VP-13A (87-92)	10/23/2009	87-92	14.19	4.55	0.100	6.60	26.3	201.2	5
VP-13A (111-116)	10/23/2009	111-116	14.49	4.88	0.037	7.70	15.1	200.7	5
VP-14 (35-40)	10/16/2009	35-40	14.94	4.76	0.252	2.87	180	177.5	5
VP-14 (55-60)	10/16/2009	55-60	14.59	4.60	0.085	8.01	36.4	260.9	5
VP-14 (80-85)	10/19/2009	80-85	YSI multi-parameter probe not functioning						10
VP-14 (105-110)	10/19/2009	105-110	YSI multi-parameter probe not functioning						5
VP-14 (130-135)	10/19/2009	130-135	14.32	4.60	0.061	3.67	55.0	251.6	10
VP-15 (30-35)	10/12/2009	30-35	17.94	4.94	0.119	8.53	48.7	254.2	5
VP-15 (45-50)	10/12/2009	45-50	17.10	4.83	0.071	2.79	33.3	256.7	5
VP-15 (65-70)	10/13/2009	65-70	16.38	4.72	0.072	4.87	9.6	246.3	5
VP-15 (88-93)	10/13/2009	88-93	15.35	4.61	0.059	5.64	42.4	281.1	5
VP-15 (114-119)	10/13/2009	114-119	16.83	4.15	0.036	0.32	65.2	107.7	5
VP-15A (15-20)	10/20/2009	15-20	17.28	5.56	0.518	5.77	34.1	131.0	30
VP-15A (38-43)	10/21/2009	38-43	14.53	4.75	0.084	4.01	44.6	214.3	5
VP-15A (55-60)	10/21/2009	55-60	14.44	4.52	0.049	4.20	43.0	268.5	5
VP-15A (77-82)	10/21/2009	77-82	14.83	4.39	0.046	5.72	90.0	261.1	5
VP-15A (99-104)	10/21/2009	99-104	14.37	3.67	0.054	6.60	9.2	271.6	5
Minimum			12.82	3.67	0.03	0.23	3.70	107.70	5.00
Maximum			19.17	5.56	0.52	8.59	180.00	302.30	50.00
Average			15.23	4.48	0.13	4.92	42.46	231.87	9.80
Standard Deviation			1.57	0.35	0.13	2.90	36.36	49.70	9.95

Notes:

- All vertical profiling samples collected via a screened auger tool equipped with a packer/submersible pump assembly.
- Temperature, pH, conductivity, DO, turbidity and ORP was determined with a YSI 6820 multi-parameter meter installed in a flow-through cell.
- Alkalinity was determined with a Hach Alkalinity Test Kit, Model AL-AP.
- ORP - Oxidation-reduction potential
- ftbgs - feet below ground surface
- °C - Degrees Celsius
- mS/cm - MilliSiemens per centimeter
- mg/L - Milligrams per liter (parts per million)
- NTU - nephelometric turbidity units
- mV - Millivolts

TABLE 3-2
VERTICAL GROUNDWATER PROFILING WATER QUALITY INDICATOR PARAMETERS

2010 OU1 Supplemental RI
 Shieldalloy Metallurgical Corporation
 Newfield, New Jersey

Sample ID	Date Analyzed	Sample Depth (ftbgs)	Temperature (°C)	pH	Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	Turbidity (NTU)	ORP (mV)
VP-16 (20-24)	10/5/2010	20-24	16.99	6.10	0.789	0.18	1133.0	-525.0
VP-16 (45-49)	10/5/2010	45-49	16.56	7.11	0.592	0.27	1130.0	-581.0
VP-16 (70-74)	10/5/2010	70-74	16.35	8.04	0.549	0.41	1128.0	-410.0
VP-16 (95-99)	10/4/2010	95-99	16.49	7.78	0.566	1.35	1129.0	-241.0
VP-16 (120-124)	10/4/2010	120-124	16.69	5.34	0.340	6.12	429.0	-44.0
VP-17 (20-24)	10/7/2010	20-24	21.56	5.77	0.090	0.89	7.5	-75.8
VP-17 (45-49)	10/7/2010	45-49	18.40	6.17	0.364	-0.07	1203.0	-396.1
VP-17 (70-74)	10/7/2010	70-74	17.56	7.47	0.234	5.59	1201.1	-110.3
VP-17 (95-99)	10/7/2010	95-99	18.06	8.86	0.297	3.90	1205.6	-207.5
VP-17 (120-124)	10/7/2010	120-124	20.45	5.53	0.232	2.10	284.0	-22.3
VP-18 (20-24)	10/6/2010	20-24	NM	6.43	0.132	0.87	1223	-369.8
VP-18 (45-49)	10/6/2010	45-49	18.31	6.70	0.313	1.66	1208	-194.2
VP-18 (70-74)	10/6/2010	70-74	17.72	7.82	0.269	5.16	1203.2	-162.2
VP-18 (95-99)	10/6/2010	95-99	17.68	9.71	0.317	6.16	1202.6	-202.6
VP-18 (117-121)	10/6/2010	117-121	17.86	5.25	0.131	7.95	516.7	70.0
VP-19 (20-24)	10/8/2010	20-24	17.45	5.41	0.084	0.17	453.7	29.9
VP-19 (45-49)	10/8/2010	45-49	16.76	6.39	0.288	0.16	1193.5	-427.4
VP-19 (70-74)	10/8/2010	70-74	16.36	7.94	0.291	2.73	1190.1	-89.4
VP-19 (95-99)	10/8/2010	95-99	16.07	6.52	0.250	1.61	906.4	-1.5
VP-19 (120-124)	10/8/2010	120-124	15.80	5.96	0.227	0.28	1185.5	-152.8
Minimum			15.80	5.25	0.08	-0.07	7.50	-581.00
Maximum			21.56	9.71	0.79	7.95	1223.00	70.00
Average			17.53	5.94	0.32	2.37	956.65	-205.65
Standard Deviation			1.45	1.24	0.18	2.51	384.01	188.55

Notes:

(1) No average pH was calculated because pH values are exponents.

-All vertical profiling samples collected via Geoprobe 8040DT direct-push rig with deployable screen.

-Temperature, pH, conductivity, DO, turbidity and ORP was determined with a YSI 6820 multi-parameter meter installed in a flow-through cell.

ORP - Oxidation-reduction potential

ftbgs - feet below ground surface

°C - Degrees Celsius

mS/cm - MilliSiemens per centimeter

mg/L - Milligrams per liter (parts per million)

NTU - nephelometric turbidity units

mV - Millivolts

NM - Not Measured

TABLE 3-3
VERTICAL GROUNDWATER PROFILING SAMPLE SUMMARY
2009/2010 OU1 Supplemental RI
Shieldalloy Metallurgical Corporation
Newfield, New Jersey

Sample ID	Date Collected	Approximate Ground Surface Elevation (ftmsl)	Sample Depth (ftbgs)	Approximate Sample Elevation (ftmsl)	Laboratory Analytical Parameter ⁽¹⁾	Field Test Analytical Parameters ⁽²⁾	Notes ⁽³⁾
VP-13 (25-30)	10/14/2009	102	25-30	77 to 72	VOCs, Total Cr, Cr ⁺⁶ , Nitrate, Methane & Fe ⁺²	Alkalinity	
VP-13 (50-55)	10/14/2009	102	50-55	52 to 47	VOCs, Total Cr, Cr ⁺⁶ , Nitrate, Methane & Fe ⁺²	Alkalinity	
VP-13 (75-80)	10/14/2009	102	75-80	27 to 22	VOCs, Total Cr, Cr ⁺⁶ , Nitrate, Methane & Fe ⁺²	Alkalinity	
VP-13 (100-105)	10/15/2009	102	100-105	2 to -3	VOCs, Total Cr, Cr ⁺⁶ , Nitrate, Methane & Fe ⁺²	Alkalinity	
VP-13 (125-130)	10/15/2009	102	125-130	-23 to -28	VOCs, Total Cr, Cr ⁺⁶ , Nitrate, Methane & Fe ⁺²	Alkalinity	
VP-13A (15-20)	10/22/2009	89	15-20	74 to 69	VOCs, Total Cr, Cr ⁺⁶ , Nitrate, Methane & Fe ⁺²	Alkalinity	
VP-13A (37-42)	10/22/2009	89	37-42	52 to 47	VOCs, Total Cr, Cr ⁺⁶ , Nitrate, Methane & Fe ⁺²	Alkalinity	
VP-13A (62-67)	10/22/2009	89	62-67	27 to 22	VOCs, Total Cr, Cr ⁺⁶ , Nitrate, Methane & Fe ⁺²	Alkalinity	
VP-13A (87-92)	10/23/2009	89	87-92	2 to -3	VOCs, Total Cr, Cr ⁺⁶ , Nitrate, Methane & Fe ⁺²	Alkalinity	MS, MSD
VP-13A (111-116)	10/23/2009	89	111-116	-22 to -27	VOCs, Total Cr, Cr ⁺⁶ , Nitrate, Methane & Fe ⁺²	Alkalinity	
VP-14 (35-40)	10/16/2009	100	35-40	65 to 60	VOCs, Total Cr, Cr ⁺⁶ , Nitrate, Methane & Fe ⁺²	Alkalinity	
VP-14 (55-60)	10/16/2009	100	55-60	45 to 40	VOCs, Total Cr, Cr ⁺⁶ , Nitrate, Methane & Fe ⁺²	Alkalinity	
VP-14 (80-85)	10/19/2009	100	80-85	20 to 15	VOCs, Total Cr, Cr ⁺⁶ , Nitrate, Methane & Fe ⁺²	Alkalinity	
VP-14 (105-110)	10/19/2009	100	105-110	-5 to -10	VOCs, Total Cr, Cr ⁺⁶ , Nitrate, Methane & Fe ⁺²	Alkalinity	MS, MSD
VP-24 (105-110)	10/19/2009	100	105-110	-5 to -10	VOCs, Total Cr, Cr ⁺⁶ , Nitrate, Methane & Fe ⁺²	Alkalinity	Field Duplicate
VP-14 (130-135)	10/19/2009	100	130-135	-30 to -35	VOCs, Total Cr, Cr ⁺⁶ , Nitrate, Methane & Fe ⁺²	Alkalinity	
VP-15 (30-35)	10/12/2009	91	30-35	61 to 56	VOCs, Total Cr, Cr ⁺⁶ , Nitrate, Methane & Fe ⁺²	Alkalinity	
VP-15 (45-50)	10/12/2009	91	45-50	46 to 41	VOCs, Total Cr, Cr ⁺⁶ , Nitrate, Methane & Fe ⁺²	Alkalinity	
VP-15 (65-70)	10/13/2009	91	65-70	26 to 21	VOCs, Total Cr, Cr ⁺⁶ , Nitrate, Methane & Fe ⁺²	Alkalinity	
VP-15 (88-93)	10/13/2009	91	88-93	3 to -2	VOCs, Total Cr, Cr ⁺⁶ , Nitrate, Methane & Fe ⁺²	Alkalinity	
VP-15 (114-119)	10/13/2009	91	114-119	-23 to -28	VOCs, Total Cr, Cr ⁺⁶ , Nitrate, Methane & Fe ⁺²	Alkalinity	
VP-15A (15-20)	10/20/2009	76	15-20	61 to 56	VOCs, Total Cr, Cr ⁺⁶ , Nitrate, Methane & Fe ⁺²	Alkalinity	
VP-15A (38-43)	10/21/2009	76	38-43	38 to 33	VOCs, Total Cr, Cr ⁺⁶ , Nitrate, Methane & Fe ⁺²	Alkalinity	
VP-15A (55-60)	10/21/2009	76	55-60	21 to 16	VOCs, Total Cr, Cr ⁺⁶ , Nitrate, Methane & Fe ⁺²	Alkalinity	
VP-15A (77-82)	10/21/2009	76	77-82	-1 to -6	VOCs, Total Cr, Cr ⁺⁶ , Nitrate, Methane & Fe ⁺²	Alkalinity	
VP-15A (99-104)	10/21/2009	76	99-104	-23 to -28	VOCs, Total Cr, Cr ⁺⁶ , Nitrate, Methane & Fe ⁺²	Alkalinity	
VP-25A (99-104)	10/21/2009	76	99-104	-23 to -28	VOCs, Total Cr, Cr ⁺⁶ , Nitrate, Methane & Fe ⁺²	Alkalinity	Field Duplicate

TABLE 3-3
VERTICAL GROUNDWATER PROFILING SAMPLE SUMMARY
2009/2010 OU1 Supplemental RI
Shieldalloy Metallurgical Corporation
Newfield, New Jersey

Sample ID	Date Collected	Approximate Ground Surface Elevation (ftmsl)	Sample Depth (ftbgs)	Approximate Sample Elevation (ftmsl)	Laboratory Analytical Parameter ⁽¹⁾	Field Test Analytical Parameters ⁽²⁾	Notes ⁽³⁾
VP-16 (20-24)	10/5/2010	91	20-24	71 to 67	VOCs, Total Cr and Cr ⁺⁶ (Filtered and Unfiltered)	NA	
VP-16 (45-49)	10/5/2010	91	45-49	46 to 42	VOCs, Total Cr and Cr ⁺⁶ (Filtered and Unfiltered)	NA	
VP-16 (70-74)	10/5/2010	91	70-74	21 to 17	VOCs, Total Cr and Cr ⁺⁶ (Filtered and Unfiltered)	NA	
VP-16 (95-99)	10/4/2010	91	95-99	-4 to -8	VOCs, Total Cr and Cr ⁺⁶ (Filtered and Unfiltered)	NA	
VP-16 (120-124)	10/4/2010	91	120-124	-29 to -33	VOCs, Total Cr and Cr ⁺⁶ (Filtered and Unfiltered)	NA	
VP-17 (20-24)	10/7/2010	91	20-24	71 to 67	VOCs, Total Cr and Cr ⁺⁶ (Filtered and Unfiltered)	NA	
VP-17 (45-49)	10/7/2010	91	45-49	46 to 42	VOCs, Total Cr and Cr ⁺⁶ (Filtered and Unfiltered)	NA	
VP-17 (70-74)	10/7/2010	91	70-74	21 to 17	VOCs, Total Cr and Cr ⁺⁶ (Filtered and Unfiltered)	NA	
VP-17 (95-99)	10/7/2010	91	95-99	-4 to -8	VOCs, Total Cr and Cr ⁺⁶ (Filtered and Unfiltered)	NA	
VP-17 (120-124)	10/7/2010	91	120-124	-29 to -33	VOCs, Total Cr and Cr ⁺⁶ (Filtered and Unfiltered)	NA	
VP-18 (20-24)	10/6/2010	92	20-24	72 to 68	VOCs, Total Cr and Cr ⁺⁶ (Filtered and Unfiltered)	NA	
VP-18 (45-49)	10/6/2010	92	45-49	47 to 43	VOCs, Total Cr and Cr ⁺⁶ (Filtered and Unfiltered)	NA	
VP-18 (70-74)	10/6/2010	92	70-74	22 to 18	VOCs, Total Cr and Cr ⁺⁶ (Filtered and Unfiltered)	NA	
VP-18 (95-99)	10/6/2010	92	95-99	-3 to -7	VOCs, Total Cr and Cr ⁺⁶ (Filtered and Unfiltered)	NA	
VP-18 (117-121)	10/6/2010	92	117-121	-28 to -32	VOCs, Total Cr and Cr ⁺⁶ (Filtered and Unfiltered)	NA	
VP-19 (20-24)	10/8/2010	93	20-24	73 to 69	VOCs, Total Cr and Cr ⁺⁶ (Filtered and Unfiltered)	NA	
VP-19 (45-49)	10/8/2010	93	45-49	48 to 44	VOCs, Total Cr and Cr ⁺⁶ (Filtered and Unfiltered)	NA	
VP-19 (70-74)	10/8/2010	93	70-74	23 to 19	VOCs, Total Cr and Cr ⁺⁶ (Filtered and Unfiltered)	NA	
VP-19 (95-99)	10/8/2010	93	95-99	-2 to -6	VOCs, Total Cr and Cr ⁺⁶ (Filtered and Unfiltered)	NA	
VP-19 (120-124)	10/8/2010	93	117-121	-27 to -31	VOCs, Total Cr and Cr ⁺⁶ (Filtered and Unfiltered)	NA	

Notes:

(1) - Analyzed by New Jersey-certified Accutest Laboratories of Dayton, New Jersey and Marlborough, Massachusetts.

(2) - Alkalinity analyzed on-site using HACH Model AL-AP Drop Count Titration Test Kit.

(3) - Laboratory duplicates submitted to Accutest Laboratories for internal QA/QC measures. Field duplicates submitted to Accutest Laboratories as "blind" duplicates.

ftmsl - feet above mean sea level

ftbgs - feet below ground surface

Analytical Methods:

VOCs - Volatile Organic Compounds by EPA Method 624

Total Cr. - Total chromium by SW-846 Method 6010B

Cr⁺⁶ - Hexavalent chromium by SW-846 Method 7196A

Methane by SW-846 Method 3810 modified

Nitrate by EPA Method 300 (Methods for the Determination of Inorganic Substances in Environmental Samples, "EPA/600/R-93/100", August 1993)

Fe+2 - Ferrous iron by Method 3500 FeB (Standard Methods for the Examination of Waters and Waste Waters, 20th Ed., 1998)

NA - Not Analyzed

TABLE 3-4
QUALITY ASSURANCE / QUALITY CONTROL SAMPLE SUMMARY

OU1 Supplemental RI
Shieldalloy Metallurgical Corporation
Newfield, New Jersey

Sample ID	Sample Date	Laboratory Analytical Parameter ⁽¹⁾	Field Test Analytical Parameters	Notes
TB101209	10/12/09	VOCs	Not Analyzed	Trip Blank
FB101209	10/12/09	VOCs, Total Cr, Cr ⁺⁶ , Nitrate, Methane & Fe ⁺²	Not Analyzed	Field Blank
FB101309	10/13/09	VOCs, Total Cr, Cr ⁺⁶ , Nitrate, Methane & Fe ⁺²	Not Analyzed	Field Blank
TB101309	10/13/09	VOCs	Not Analyzed	Trip Blank
TB101409	10/14/09	VOCs	Not Analyzed	Trip Blank
FB101409	10/14/09	VOCs, Total Cr, Cr ⁺⁶ , Nitrate, Methane & Fe ⁺²	Not Analyzed	Field Blank
FB101509	10/15/09	VOCs, Total Cr, Cr ⁺⁶ , Nitrate, Methane & Fe ⁺²	Not Analyzed	Field Blank
TB101509	10/15/09	VOCs	Not Analyzed	Trip Blank
FB101609	10/16/09	VOCs, Total Cr, Cr ⁺⁶ & Nitrate	Not Analyzed	Field Blank
TB101609	10/16/09	VOCs	Not Analyzed	Trip Blank
FB101909	10/19/09	VOCs, Total Cr, Cr ⁺⁶ , Nitrate & Methane	Not Analyzed	Field Blank
TB101909	10/19/09	VOCs	Not Analyzed	Trip Blank
TB102009	10/20/09	VOCs	Not Analyzed	Trip Blank
FB102009	10/20/09	VOCs, Total Cr, Cr ⁺⁶ , Nitrate, Methane & Fe ⁺²	Not Analyzed	Field Blank
FB102109	10/21/09	VOCs, Total Cr, Cr ⁺⁶ , Nitrate, Methane & Fe ⁺²	Not Analyzed	Field Blank
TB102209	10/22/09	VOCs	Not Analyzed	Trip Blank
FB102209	10/22/09	VOCs, Total Cr, Cr ⁺⁶ , Nitrate, Methane & Fe ⁺²	Not Analyzed	Field Blank
FB102309	10/23/09	VOCs, Total Cr, Cr ⁺⁶ , Nitrate, Methane & Fe ⁺²	Not Analyzed	Field Blank
TB102309	10/23/09	VOCs	Not Analyzed	Trip Blank
TB	11/04/10	VOCs	Not Analyzed	Trip Blank

Notes:

(1) - Analyzed by New Jersey-certified Accutest Laboratories of Dayton, New Jersey.

TABLE 3-5
MONITORING WELL DEVELOPMENT SUMMARY

OU1 Supplemental RI
Shieldalloy Metallurgical Corporation
Newfield, New Jersey

Well ID	Purge Time	Purge Volume (Gallons)	Final Turbidity (NTU)
SC33D	1 hour, 30 minutes	170	26.1
SC34D	2 hours	160	8.61
SC35D	2 hours, 5 minutes	170	20.1
SC36D	1 hour, 30 minutes	115	4.0
SC37S	40 minutes	50	*
SC38I	25 minutes	50	*

Notes:

* The turbidity of the development water was not measured, however the well was developed until the water was visibly free of suspended solids.

TABLE 3-6
VERTICAL GROUNDWATER PROFILING ANALYTICAL RESULTS (2009 Investigation)

OU1 Supplemental RI
Shieldalloy Metallurgical Corporation
Newfield, New Jersey

Sample ID	Units	VP-13 (25-30)	VP-13 (50-55)	VP-13 (75-80)	VP-13 (100-105)	VP-13 (125-130)	VP-13A (15-20)	VP-13A (37-42)	VP-13A (62-67)	VP-13A (87-92)	VP-13A (111-116)	VP-14 (35-40)	VP-14 (55-60)	VP-14 (80-85)	VP-14 (105-110)	VP-24 (105-110)	VP-14 (130-135)	New Jersey Ground Water Quality Standards ⁽¹⁾	Federal Drinking Water Maximum Contaminant Levels
Approximate Ground Surface Elevation (ftmsl)		104	104	104	104	104	90	90	90	90	90	100	100	100	100	100	100		
Depth Interval (ftbgs)		25-30	50-55	75-80	100-105	125-130	15-20	37-42	62-67	87-92	111-116	35-40	55-60	80-85	105-110	105-110	130-135		
Approximate Sample Elevation (ftmsl)		79 to 74	54 to 51	29 to 24	4 to -1	-21 to -26	75 to 70	53 to 48	28 to 23	3 to -2	-21 to -26	65 to 60	45 to 40	20 to 15	-5 to -10	-5 to -10	-30 to -35		
Date Sampled		10/14/2009	10/14/2009	10/14/2009	10/15/2009	10/15/2009	10/22/2009	10/22/2009	10/22/2009	10/23/2009	10/23/2009	10/16/2009	10/16/2009	10/19/2009	10/19/2009	10/19/2009	10/19/2009		
Notes																Duplicate of VP-14 (105-110)			
Volatile Organic Compounds (VOCs)																			
Benzene	ug/L	ND	ND	ND	ND	ND	ND	ND	894	1.7	1.2	ND	ND	ND	ND	ND	ND	0.2	5
Carbon Tetrachloride	ug/L	ND	1.7	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.4	5
Chloroform	ug/L	ND	0.59	ND	ND	ND	ND	ND	0.3 J	ND	ND	ND	ND	ND	ND	ND	ND	70	80
1,1-Dichloroethane	ug/L	ND	1.8	0.6	ND	ND	ND	ND	0.45 J	ND	ND	ND	ND	ND	ND	ND	ND	50	--
1,2-Dichloroethene (Cis)	ug/L	ND	0.74	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.51 J	70	70
Methylene Chloride	ug/L	ND	ND	ND	ND	ND	ND	ND	0.93 J	ND	ND	ND	ND	ND	ND	ND	ND	3	--
Trichloroethene	ug/L	ND	ND	3.2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	3.9	4.0	16.1	1	5
Xylenes (Total)	ug/L	ND	ND	ND	ND	ND	ND	ND	3.4	ND	ND	ND	ND	ND	ND	ND	ND	1,000	10,000
VOC TICs (Total)	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	--
Inorganics																			
Total Chromium	ug/L	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	13.1	<10	<10	<10	<10	<10	100	100
Hexavalent Chromium (Cr ^{VI})	ug/L	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	--	--
Field Screening Analyses																			
Total Alkalinity	mg/L	50	10	10	10	10	10	10	15	5	5	5	10	5	10	10	5	--	--
Ground Water Chemistry Parameters																			
Ferrous Iron (Fe ^{II})	mg/L	0.29	0.14	0.22	0.31	<0.1	1.7	0.25	0.78	0.25	<0.1	0.89	0.39	0.43	0.43	0.48	0.38	--	--
Methane	ug/L	<0.3	<0.3	<0.3	0.073JB	<0.3	8.73	0.18	102	<0.3	0.23	5.37	<0.3	<0.3	0.072 JB	<0.3	0.16 JB	--	--
Nitrogen as Nitrite	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	0.019	<0.01	0.019	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	1	1
Nitrogen as Nitrate	mg/L	8.2	9.2	12.3	11.4	2.3	8.6	12.5	11.2	9.4	3	5.5	5.9	19.2	24.6	24.4	3.7	10	10

NOTES:

Gray shaded results indicate an exceedance of the New Jersey Ground Water Quality Standards (N.J.A.C. 7:9C) or site-specific clean-up criterion.

Underlined results indicate an exceedance of the Federal Drinking Water Maximum Contaminant Levels (40 CFR, Chapter 1, Part 141).

All laboratory analyses conducted by New Jersey-certified Accutest Laboratories of Dayton, New Jersey or Marlborough, MA.

(1) - Ground water clean-up criterion for total chromium specified in the Record of Decision (September 1996) of 100 ug/L.

VOC TICs - Tentatively Identified Compounds

NA - Not Analyzed

ND - Non-detect

ftbgs - feet below ground surface

mg/L - milligrams per liter (parts per million)

ug/L - micrograms per liter (parts per billion)

TABLE 3-6
VERTICAL GROUNDWATER PROFILING ANALYTICAL RESULTS (2009 Investigation)
OU1 Supplemental RI
Shieldalloy Metallurgical Corporation
Newfield, New Jersey

Sample ID	Units	VP-15 (30-35)	VP-15 (45-50)	VP-15 (65-70)	VP-15 (88-93)	VP-15 (114-119)	VP-15A (15-20)	VP-15A (38-43)	VP-15A (55-60)	VP-15A (77-82)	VP-15A (99-104)	VP-25A (99-104)	New Jersey Ground Water Quality Standards ⁽¹⁾	Federal Drinking Water Maximum Contaminant Levels
Approximate Ground Surface Elevation (ftmsl)		91	91	91	91	91	79	79	79	79	79	79		
Depth Interval (ftbgs)		30-35	45-50	65-70	88-93	114-119	15-20	38-43	55-60	77-82	99-104	99-104		
Approximate Sample Elevation (ftmsl)		61 to 56	46 to 41	26 to 21	3 to -2	-23 to -28	64 to 59	41 to 36	24 to 19	2 to -3	-20 to -25	-20 to -25		
Date Sampled		10/12/2009	10/12/2009	10/13/2009	10/13/2009	10/13/2009	10/20/2009	10/21/2009	10/21/2009	10/21/2009	10/21/2009	10/21/2009		
Notes												Duplicate of VP-15A (99-104)		
<u>Volatile Organic Compounds (VOCs)</u>														
Benzene	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.2	5
Carbon Tetrachloride	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.4	5
Chloroform	ug/L	ND	ND	0.34 J	ND	ND	ND	ND	ND	ND	ND	ND	70	80
1,1-Dichloroethane	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	50	--
1,2-Dichloroethene (Cis)	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	70	70
Methylene Chloride	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	3	--
Trichloroethene	ug/L	ND	ND	ND	3.8	ND	ND	ND	ND	ND	ND	ND	1	5
Xylenes (Total)	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1,000	10,000
VOC TICs (Total)	ug/L	ND	ND	14.4 J	ND	ND	ND	ND	ND	ND	ND	ND	--	--
<u>Inorganics</u>														
Total Chromium	ug/L	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	100	100
Hexavalent Chromium (Cr ⁶⁺)	ug/L	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	--	--
<u>Field Screening Analyses</u>														
Total Alkalinity	mg/L	5	5	5	5	5	30	5	5	5	5	5	--	--
<u>Ground Water Chemistry Parameters</u>														
Ferrous Iron (Fe ⁺²)	mg/L	<0.1	0.17	0.17	<0.1	0.7	0.41	0.27	0.13	0.14	0.15	0.11	--	--
Methane	ug/L	0.12	0.34	<0.3	0.14	1.83	<0.3	0.10 JB	0.21 JB	0.56 B	0.24 JB	0.14 JB	--	--
Nitrogen as Nitrite	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	1	1
Nitrogen as Nitrate	mg/L	0.78	1.2	1.8	5	<0.11	4	2.2	3.2	3.7	5.1	5.3	10	10

NOTES:

Gray shaded results indicate an exceedance of the New Jersey Ground Water Quality Standards (N.J.A.C. 7:9C) or site-specific clean-up criterion.

Underlined results indicate an exceedance of the Federal Drinking Water Maximum Contaminant Levels (40 CFR, Chapter 1, Part 141).

All laboratory analyses conducted by New Jersey-certified Accutest Laboratories of Dayton, New Jersey or Marlborough, MA.

(1) - Ground water clean-up criterion for total chromium specified in the Record of Decision (September 1996) of 100 ug/L.

VOC TICs - Tentatively Identified Compounds

NA - Not Analyzed

ND - Non-detect

ftbgs - feet below ground surface

mg/L - milligrams per liter (parts per million)

ug/L - micrograms per liter (parts per billion)

TABLE 3-7
MONITORING WELL ANALYTICAL RESULTS
OCTOBER - DECEMBER 2009
OU1 Supplemental RI
Shieldalloy Metallurgical Corporation
Newfield, New Jersey

Well Number Screened Interval (ftbgs) Sample Date	Units	SC33D 82.5-92.5 11/19/2009	SC34D 130-140 11/19/2009	SC35D 89.5-99.5 12/7/2009	SC36D 107-117 12/7/2009	New Jersey Ground Water Quality Standards ⁽¹⁾	Federal Drinking Water Maximum Contaminant Levels
<u>Volatile Organic Compounds (VOCs)</u>							
1,2-Dichloroethene	ug/L	ND	0.67 J	ND	ND	70	70
Tetrachloroethene	ug/L	0.74 J	ND	ND	ND	0.4	5
Toluene	ug/L	0.23 J	ND	ND	ND	600	1,000
Trichloroethene	ug/L	ND	35.7	ND	ND	1	5
VOC TICs	ug/L	3.1 J	ND	ND	ND	--	--
Methane	ug/L	0.43	11.9	0.34	0.7	--	--
<u>Inorganics</u>							
Chromium (Total)	ug/L	<10	<10	<10	<10	100	100
Hexavalent Chromium (Cr ⁺⁶)	ug/L	4.9 B	<10	<10	<10	--	--
Sodium	ug/L	28,500	67,000	8,410	7,290	50,000	--
<u>Aquifer Chemistry Parameters</u>							
Ferrous Iron (Fe ⁺²) (laboratory analysis)	mg/L	0.095 B	0.28	<0.2	<0.2	0	--
Ferrous Iron (Fe ⁺²) (field screening)	mg/L	ND	ND	ND	ND	0	--
Nitrogen as Nitrate	mg/L	2.5	2.2	3.8	3.2	10	10
Nitrogen as Nitrite	mg/L	<0.01	0.017	<0.01	0.017	1	1
Alkalinity (field screening)	mg/L	40	68	15	10	--	--
pH ⁽⁴⁾	NA	9.75	7.08	8.23	6.28	6.5 to 8.5	--
Temperature	°C	13.44	13.02	13.48	12.75	--	--
Specific Conductivity	mS/cm	0.216	0.882	0.095	0.079	--	--
Sulfate	mg/L	34.6	316	6.7	6.6	250	--

NOTES:

Shaded results indicate an exceedance of the New Jersey Ground Water Quality Standards (N.J.A.C. 7:9C) or site-specific clean-up criterion.

Underlined results indicate an exceedance of the Federal Drinking Water Maximum Contaminant Levels (40 CFR, Chapter 1, Part 141).

ftbgs - feet below ground surface

ug/L - micrograms per liter.

mg/L - milligrams per liter.

ND - Non-Detect

NA - Not Analyzed

°C - degrees Celsius.

mS/cm - milliSiemens per centimeter.

(1) - Ground water clean-up criterion for total chromium specified in the Record of Decision (ROD - September 1996) of 100 ug/L.

(2) - Ferrous iron analyzed by NJ-certified Accutest Laboratories of Dayton, New Jersey.

(3) - Ferrous iron field analyzed using HACH Ferrous Iron Model IR-18C Test Kit.

(4) - Field tested pH result expressed in standard units.

METHODS:

VOCs - Volatile Organic Compounds via EPA Method 624.

Total Chromium via SW-846 Method 6010B.

Hexavalent Chromium via SW-846 Method 7196A.

Ferrous Iron via Method 3500 FeB (Standard Methods for the Examination of Waters and Waste Waters, 20th Ed., 1998).

Sulfate via EPA Method 300.0

QUALIFIERS:

B - Indicates value is >= minimum detection limit but < reporting limit

J - Indicates an estimated value (organics).

TABLE 3-8
GROUNDWATER QUALITY CONTROL SAMPLE ANALYTICAL RESULTS

OU1 Supplemental RI
Shieldalloy Metallurgical Corporation
Newfield, New Jersey

Sample ID Date Sampled Notes	Units	TB101209 10/12/09 Trip Blank	FB101209 10/12/09 Field Blank	FB101309 10/13/09 Field Blank	TB101309 10/13/09 Trip Blank	TB101409 10/14/09 Trip Blank	FB101409 10/14/09 Field Blank	FB101509 10/15/09 Field Blank	TB101509 10/15/09 Trip Blank	FB101609 10/16/09 Field Blank	TB101609 10/16/09 Trip Blank	FB101909 10/19/09 Field Blank	TB101909 10/19/09 Trip Blank	TB102009 10/20/09 Trip Blank	FB102009 10/20/09 Field Blank	FB102109 10/21/09 Field Blank	TB102209 10/22/09 Trip Blank	FB102209 10/22/09 Field Blank	FB102309 10/23/09 Field Blank	TB102309 10/23/09 Trip Blank	FB111909 11/19/09 Field Blank	TB120709 12/7/09 Trip Blank	New Jersey Groundwater Quality Standards ⁽¹⁾	Federal Drinking Water Maximum Contaminant Levels
<u>Volatile Organic Compounds (VOCs)</u>																								
Benzene	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.85	ND	ND	ND	ND	0.2	5
Methylene Chloride	ug/L	ND	ND	ND	0.33 J	0.39 J	ND	ND	ND	ND	ND	ND	0.29 J	0.28 J	ND	ND	ND	0.27 J	ND	ND	ND	ND	3	--
<u>Inorganics</u>																								
Total Chromium	ug/L	NA	<10	<10	NA	NA	<10	<10	NA	<10	NA	<10	NA	NA	<10	<10	NA	<10	<10	NA	<10	NA	100	100
Hexavalent Chromium (Cr ^{VI})	ug/L	NA	<10	<10	NA	NA	<10	<10	NA	<10	NA	<10	NA	NA	<10	<10	NA	<10	<10	NA	<10	NA	--	--
Sodium	ug/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<10,000	NA	50,000	--
<u>Ground Water Chemistry Parameters</u>																								
Ferrous Iron (Fe ^{II})	mg/L	NA	<0.1	<0.1	NA	NA	<0.1	<0.1	NA	NA	NA	NA	NA	NA	<0.1	<0.1	NA	<0.1	<0.1	NA	<0.2	NA	0.3	--
Methane	ug/L	NA	0.99	0.47	NA	NA	<0.3	0.42	NA	NA	NA	0.26	NA	NA	<0.3	<0.3	NA	0.17	0.14	NA	0.15	NA	--	--
Nitrogen as Nitrite	mg/L	NA	<0.01	<0.01	NA	NA	<0.01	<0.01	NA	<0.01	NA	<0.01	NA	NA	<0.01	<0.01	NA	<0.01	<0.01	NA	<0.01	NA	1	1
Nitrogen as Nitrate	mg/L	NA	<0.11	<0.11	NA	NA	<0.11	<0.11	NA	<0.11	NA	<0.11	NA	NA	<0.11	<0.11	NA	<0.11	<0.11	NA	<0.11	NA	10	10
Sulfate	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.30 B	NA	250	--

NOTES:
Shaded results indicate an exceedance of the New Jersey Ground Water Quality Standards (N.J.A.C. 7:9C).
Underlined results indicate an exceedance of the Federal Drinking Water Maximum Contaminant Levels (40 CFR, Chapter 1, Part 141).
All laboratory analyses conducted by New Jersey-certified Accutest Laboratories of Dayton, New Jersey.
(1) - Ground water clean-up criterion for total chromium specified in the Record of Decision (September 1996) of 100 ug/L.
NA - Not Analyzed
ND - Non-detect
mg/L - milligrams per liter
ug/L - micrograms per liter

LABORATORY ANALYSES / METHODS:
VOCs - Volatile Organic Compounds by EPA Method 624
Total Cr - Total Chromium by SW-846 Method 6010B
Cr+6 - Hexavalent Chromium by SW-846 Method 7196A
Nitrite/Nitrate by EPA Method 300 (Methods for the Determination of Inorganic Substances in Environmental Samples, "EPA/600/R-93/100", August 1993)
Fe+2 - Ferrous Iron by Method 3500 FeB (Standard Methods for the Examination of Waters and Waste Waters, 20th Ed., 1998)

QUALIFIERS
J - Indicates an estimated value
B - Indicates a result >= MDL but < RL

TABLE 3-9
VERTICAL GROUNDWATER PROFILING ANALYTICAL RESULTS (2010 Investigation)
OU1 Supplemental RI
Shieldalloy Metallurgical Corporation
Newfield, New Jersey

Sample ID	Units	VP-16 (20-24)	VP-16 (45-49)	VP-16 (70-74)	VP-16 (95-99)	VP-16 (120-124)	VP-17 (20-24)	VP-17 (45-49)	VP-17 (70-74)	VP-17 (95-99)	VP-17 (120-124)	New Jersey Ground Water Quality Standards ⁽¹⁾	Federal Drinking Water Maximum Contaminant Levels
Approximate Ground Surface Elevation (ftmsl)		91	91	91	91	91	91	91	91	91	91		
Depth Interval (ftbgs)		20-24	45-49	70-74	95-99	120-124	20-24	45-49	70-74	95-99	120-124		
Approximate Sample Elevation (ftmsl)		71 to 67	46 to 42	21 to 17	-4 to -8	-29 to -33	71 to 67	46 to 42	21 to 17	-4 to -8	-29 to -33		
Date Sampled		10/5/2010	10/5/2010	10/5/2010	10/4/2010	10/4/2010	10/7/2010	10/7/2010	10/7/2010	10/7/2010	10/7/2010		
Volatile Organic Compounds (VOCs)													
Chloroform	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	0.34 J	ND	70	80
1,4-Dichlorobenzene	ug/L	0.75 J	ND	ND	ND	ND	ND	0.39 J	ND	ND	ND	75	75
1,1-Dichloroethane	ug/L	ND	0.62 J	2.1	1	ND	ND	ND	2	2.7	ND	50	--
1,1-Dichloroethene	ug/L	<u>3</u>	ND	0.48 J	ND	ND	ND	<u>2.5</u>	0.44 J	0.64 J	ND	1	7
cis 1,2-Dichloroethene	ug/L	9	ND	ND	ND	ND	ND	13.7	ND	ND	ND	70	70
1,1,1-Trichloroethane	ug/L	3.9	0.35 J	0.86 J	ND	ND	ND	3.7	0.87 J	1.4	ND	30	200
Trichloroethene	ug/L	<u>26.5</u>	<u>2</u>	ND	0.36	ND	ND	<u>32.8</u>	0.36 J	ND	0.52 J	1	5
Total TICs	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	--
Inorganics													
Unfiltered													
Total Chromium	ug/L	<u>648</u>	<u>322</u>	<u>1,720</u>	<u>581</u>	<u>518</u>	<u>122</u>	<u>1,170</u>	<u>950</u>	<u>820</u>	<u>3,570</u>	100	100
Hexavalent Chromium (Cr ^{VI})	ug/L	<10	<10	<10	170	<10	<10	11	<10	430	2,600	--	--
Filtered													
Total Chromium	ug/L	10.7	<10	<u>182</u>	<u>178</u>	<u>243</u>	<10	92	<u>115</u>	<u>502</u>	<u>2,600</u>	100	100
Hexavalent Chromium (Cr ^{VI})	ug/L	<10	<10	140	120	<10	<10	<10	100	540	2,900	--	--

Sample ID	Units	VP-18 (20-24)	VP-18 (45-49)	VP-18 (70-74)	VP-18 (95-99)	VP-18 (117-121)	VP-19 (20-24)	VP-19 (45-49)	VP-19 (70-74)	VP-19 (95-99)	VP-19 (120-124)	New Jersey Ground Water Quality Standards ⁽¹⁾	Federal Drinking Water Maximum Contaminant Levels
Approximate Ground Surface Elevation (ftmsl)		92	92	92	92	92	93	93	93	93	93		
Depth Interval (ftbgs)		20-24	45-49	70-74	95-99	117-121	20-24	45-49	70-74	95-99	120-124		
Approximate Sample Elevation (ftmsl)		72 to 68	47 to 43	22 to 18	-3 to -7	-28 to -32	73 to 69	48 to 44	29 to 19	-2 to -6	-27 to -31		
Date Sampled		10/6/2010	10/6/2010	10/6/2010	10/6/2010	10/6/2010	10/8/2010	10/8/2010	10/8/2010	10/8/2010	10/8/2010		
Volatile Organic Compounds (VOCs)													
Chloroform	ug/L	ND	ND	ND	0.31 J	ND	ND	ND	ND	ND	ND	70	80
1,4-Dichlorobenzene	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	75	75
1,1-Dichloroethane	ug/L	ND	ND	1.6	ND	ND	ND	ND	ND	2.4	0.49 J	50	--
1,1-Dichloroethene	ug/L	ND	0.45 J	ND	0.45 J	ND	ND	ND	ND	ND	ND	1	7
cis 1,2-Dichloroethene	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	70	70
1,1,1-Trichloroethane	ug/L	ND	1.7	0.60 J	0.91 J	ND	ND	0.57 J	ND	1	ND	30	200
Trichloroethene	ug/L	0.47 J	<u>7.4</u>	ND	0.25 J	ND	ND	<u>4.6</u>	ND	ND	0.58 J	1	5
Total TICs	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	--
Inorganics													
Unfiltered													
Total Chromium	ug/L	<u>635</u>	<u>500</u>	<u>323</u>	<u>233</u>	<u>851</u>	89.9	<u>487</u>	<u>945</u>	<u>417</u>	<u>6,100</u>	100	100
Hexavalent Chromium (Cr ^{VI})	ug/L	<10	<10	<10	33	250	<10	17	54	240	4,300	--	--
Filtered													
Total Chromium	ug/L	<10	<10	38.5	39.2	<u>467</u>	<10	<10	<10	<u>261</u>	<u>4,600</u>	100	100
Hexavalent Chromium (Cr ^{VI})	ug/L	<10	<10	22	76	320	<10	<10	<10	220	4,300	--	--

NOTES:

Gray shaded results indicate an exceedance of the New Jersey Ground Water Quality Standards (N.J.A.C. 7:9C) or site-specific clean-up criterion.

Underlined results indicate an exceedance of the Federal Drinking Water Maximum Contaminant Levels (40 CFR, Chapter 1, Part 141).

All laboratory analyses conducted by New Jersey-certified Accutest Laboratories of Dayton, New Jersey

(1) - Ground water clean-up criterion for total chromium specified in the Record of Decision (September 1996) of 100 ug/L.

VOC TICs - Tentatively Identified Compounds

ND - Non-detect

ftbgs - feet below ground surface

ug/L - micrograms per liter (parts per billion)

TABLE 3-10
NJDEP PIEZOMETER ANALYTICAL RESULTS
OU1 Supplemental RI
Shieldalloy Metallurgical Corporation
Newfield, NJ

Sample ID Well Depth (feet) Sample Date	Units	Well A-S 16.1 10/5/2010	Well A-D 25.9 10/5/2010	Well D-S 17.6 10/5/2010	Well D-D 25.7 10/5/2010	New Jersey Groundwater Quality Standards ⁽¹⁾	Federal Drinking Water Maximum Contaminant Levels
Notes							
<u>Volatile Organic Compounds (VOCs)</u>							
cis 1,2-Dichloroethene	µg/L	17.2	8.1	0.37J	1	70	70
Tetrachloroethene	µg/L	<u>114</u>	<u>95.3</u>	<u>5.8</u>	<u>12.8</u>	0.4	5
1,1,1-Trichloroethane	µg/L	ND	0.44J	ND	ND	30	200
Trichloroethene	µg/L	<u>4.8</u>	<u>2.1</u>	ND	ND	1	5
VOC TICs	µg/L	ND	ND	ND	ND	--	--
<u>Inorganics</u>							
Chromium	µg/L	20.6	ND	ND	ND	100	100
Hexavalent Chromium (Cr ⁺⁶)	µg/L	42	ND	ND	ND	--	--

NOTES:

Gray shaded results indicate an exceedance of the New Jersey Ground Water Quality Standards (N.J.A.C. 7:9C) or site-specific clean-up criterion.

Underlined results indicate an exceedance of the Federal Drinking Water Maximum Contaminant Levels (40 CFR, Chapter 1, Part 141).

All laboratory analyses conducted by New Jersey-certified Accutest Laboratories of Dayton, New Jersey.

(1) - Ground water clean-up criterion for total chromium specified in the Record of Decision (September 1996) of 100 ug/L.

VOC TICs - Tentatively Identified Compounds

ND - Non-detect

J - Estimated value.

ug/L - micrograms per liter (parts per billion)

TABLE 3-11
MONITORING WELL ANALYTICAL RESULTS (2010 Investigation)
OU1 Supplemental RI
Shieldalloy Metallurgical Corporation
Newfield, New Jersey

Sample ID	Units	SC-37S	SC-38I	New Jersey Ground Water Quality Standards ⁽¹⁾	Federal Drinking Water Maximum Contaminant Levels
Approximate Ground Surface Elevation (ftmsl)		90	91		
Depth Interval		20 -25	45 - 50		
Approximate Sample Elevation (ftmsl)		70-65	46-31		
Date Sampled		11/4/2010	11/4/2010		
Notes					
<u>Volatile Organic Compounds (VOCs)</u>					
Chloroform	ug/L	0.30 J	ND	70	80
1,2-Dichloroethene	ug/L	0.83 J	2.2	70	70
Trichloroethene	ug/L	2.2	2.2	1	5
Total TICs	ug/L	12.94	243.99	--	--
<u>INORGANICS</u>					
Total Chromium	ug/L	ND	ND	100	100
Hexavalent Chromium (Cr ⁺⁶)	ug/L	ND	ND	--	--

NOTES:

Gray shaded results indicate an exceedance of the New Jersey Ground Water Quality Standards (N.J.A.C. 7:9C) or site-specific clean-up criterion.

Underlined results indicate an exceedance of the Federal Drinking Water Maximum Contaminant Levels (40 CFR, Chapter 1, Part 141).

All laboratory analyses conducted by New Jersey-certified Accutest Laboratories of Dayton, New Jersey.

(1) - Ground water clean-up criterion for total chromium specified in the Record of Decision (September 1996) of 100 ug/L.

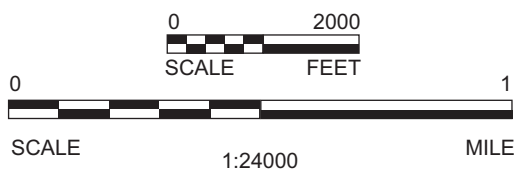
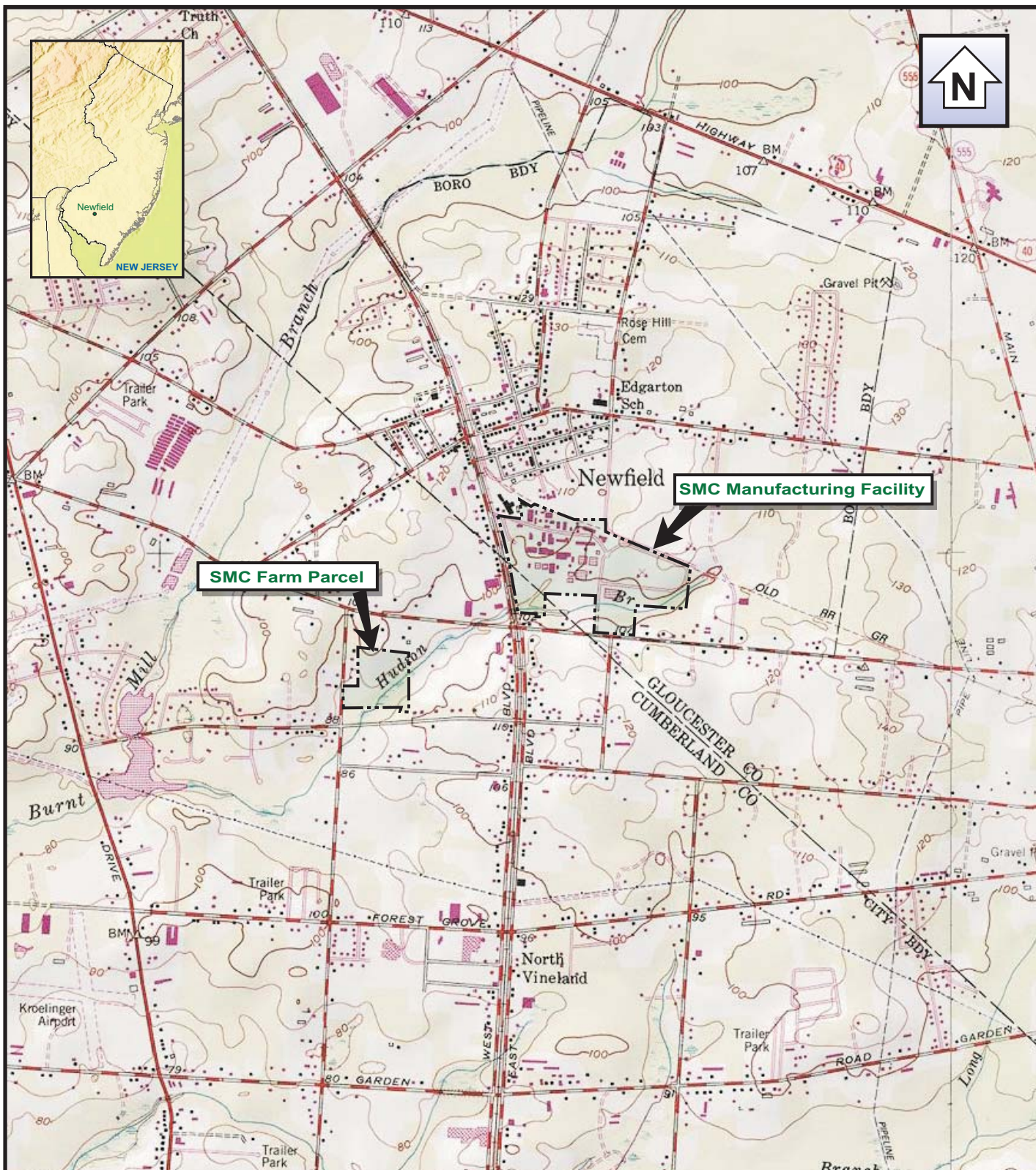
VOC TICs - Tentatively Identified Compounds

ND - Non-detect

J - Estimated value.

ug/L - micrograms per liter (parts per billion)

The trip blank "TB" associated with the November 4, 2010 monitoring well sampling yielded no VOC detections.



BASE CREATED WITH TOPO™ © 1996 WILDFLOWERS PRODUCTIONS, www.topo.com
7.5' NEWFIELD, NJ USGS TOPOGRAPHIC MAP

pers/waleszczyk/haz/smc/112434 topo.fh10



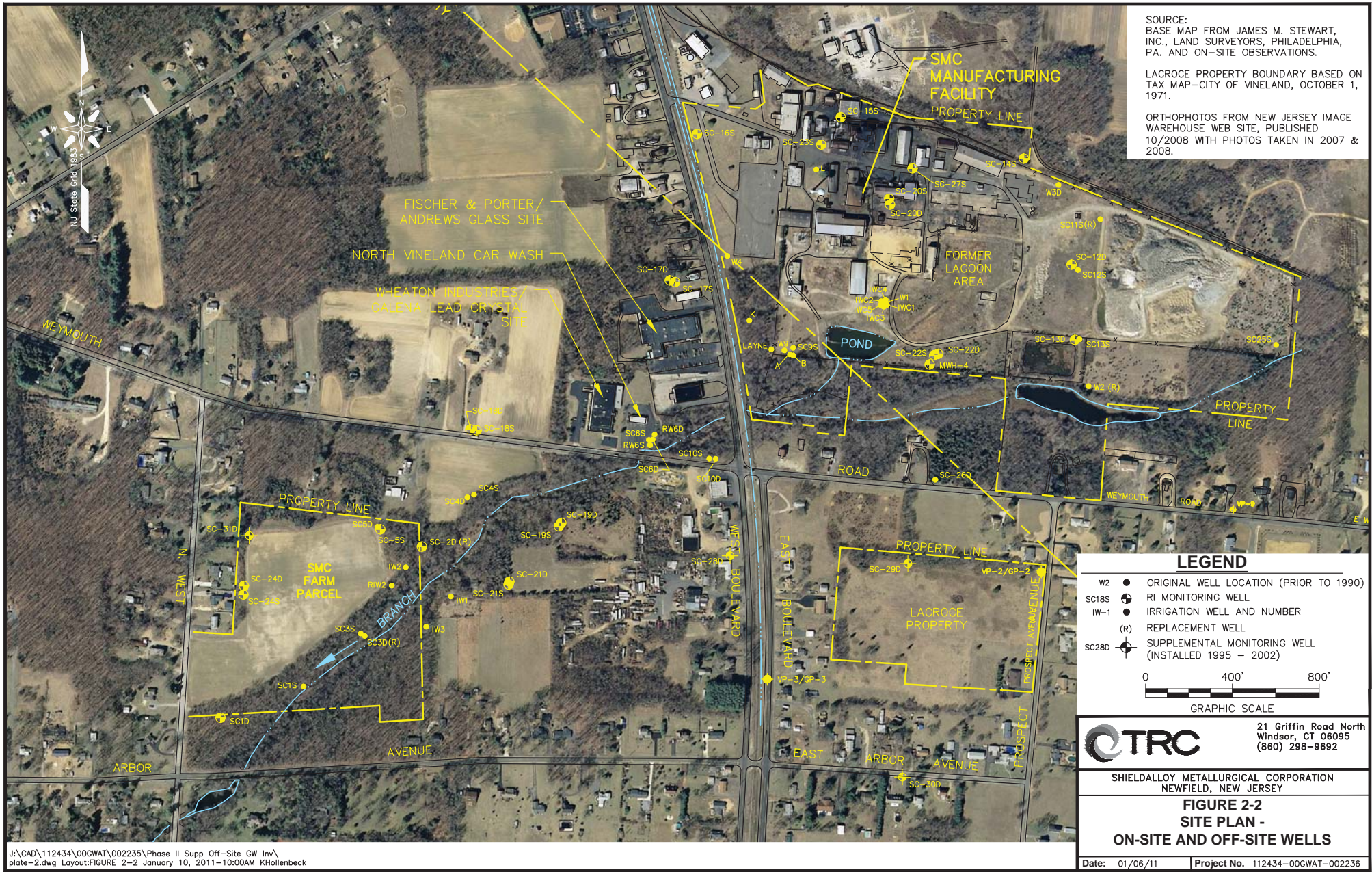
21 Griffin Road North
Windsor, CT 06095
(860) 298-9692

SHIELDALLOY METALLURGICAL CORPORATION
NEWFIELD, NEW JERSEY

FIGURE 2-1 SITE LOCATION MAP

Date: 01/11

Project No. 112434-00GWAT-002236



SOURCE:
BASE MAP FROM JAMES M. STEWART,
INC., LAND SURVEYORS, PHILADELPHIA,
PA. AND ON-SITE OBSERVATIONS.

LACROCE PROPERTY BOUNDARY BASED ON
TAX MAP-CITY OF VINELAND, OCTOBER 1,
1971.

ORTHOPHOTOS FROM NEW JERSEY IMAGE
WAREHOUSE WEB SITE, PUBLISHED
10/2008 WITH PHOTOS TAKEN IN 2007 &
2008.

LEGEND

- W2 ● ORIGINAL WELL LOCATION (PRIOR TO 1990)
- SC18S ● RI MONITORING WELL
- IW-1 ● IRRIGATION WELL AND NUMBER
- (R) REPLACEMENT WELL
- SC28D ● SUPPLEMENTAL MONITORING WELL
(INSTALLED 1995 - 2002)



GRAPHIC SCALE



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SHIELDALLOY METALLURGICAL CORPORATION
NEWFIELD, NEW JERSEY

**FIGURE 2-2
SITE PLAN -
ON-SITE AND OFF-SITE WELLS**

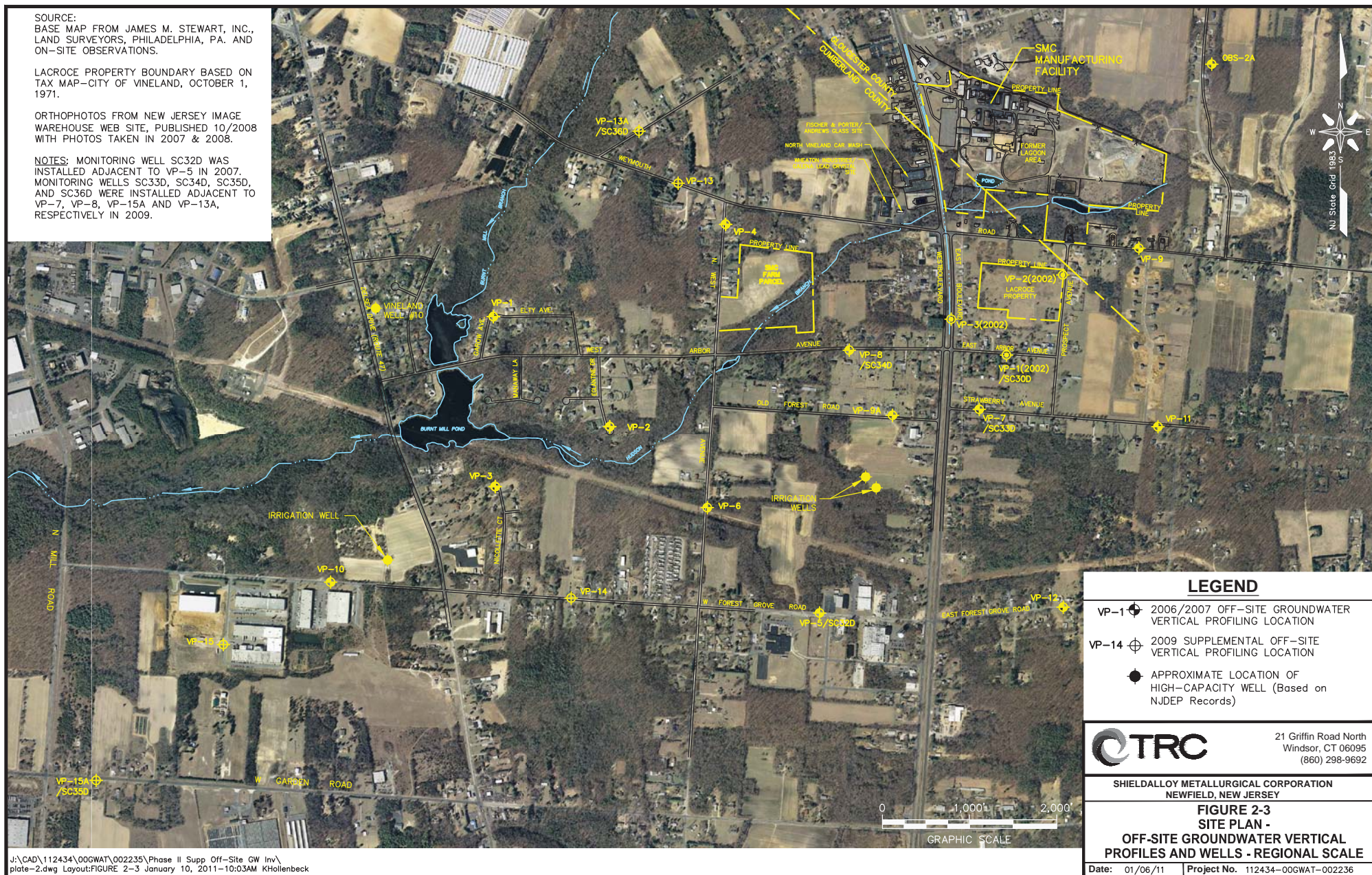
Date: 01/06/11 Project No. 112434-00GWAT-002236

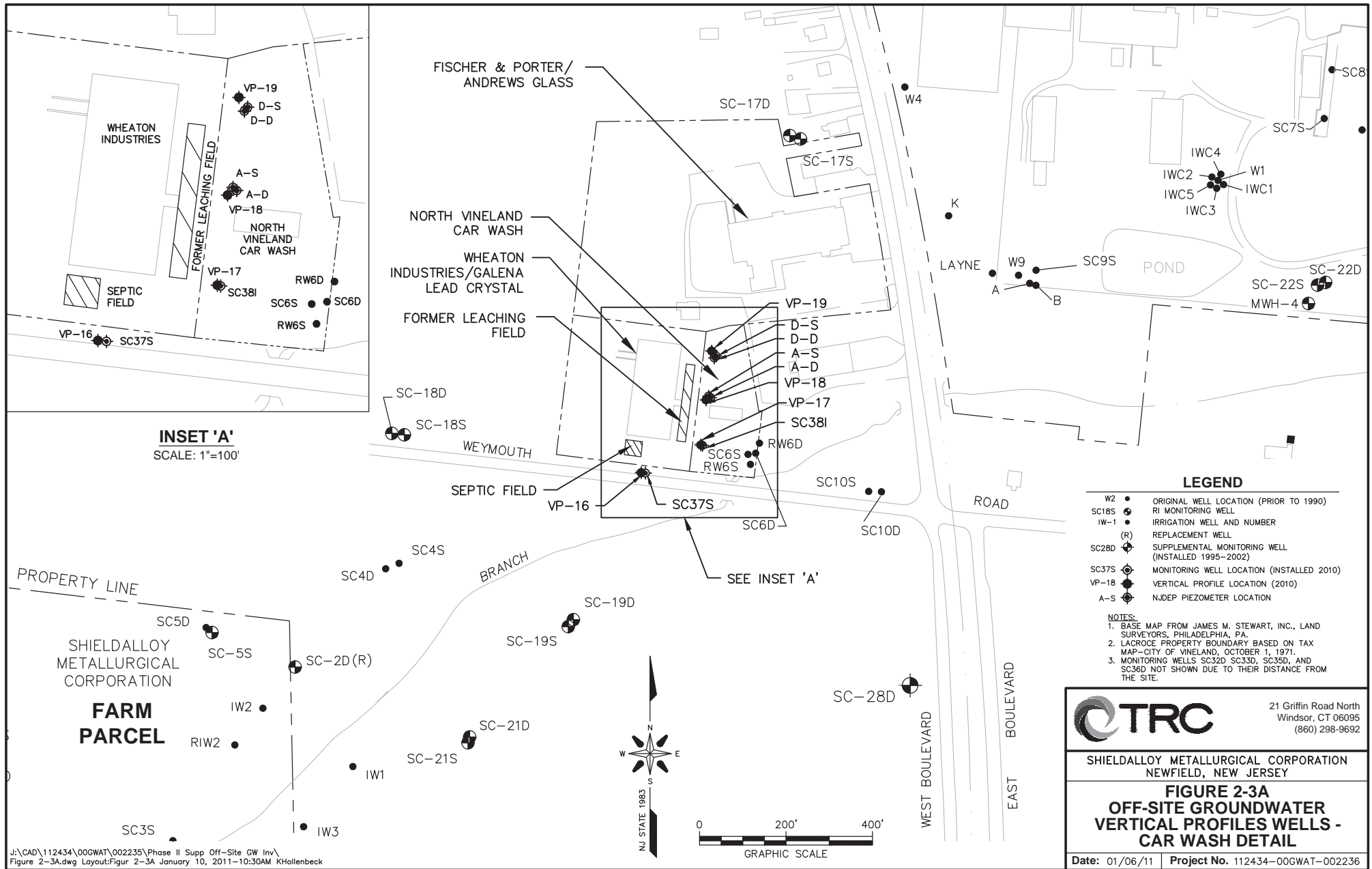
SOURCE:
BASE MAP FROM JAMES M. STEWART, INC.,
LAND SURVEYORS, PHILADELPHIA, PA. AND
ON-SITE OBSERVATIONS.

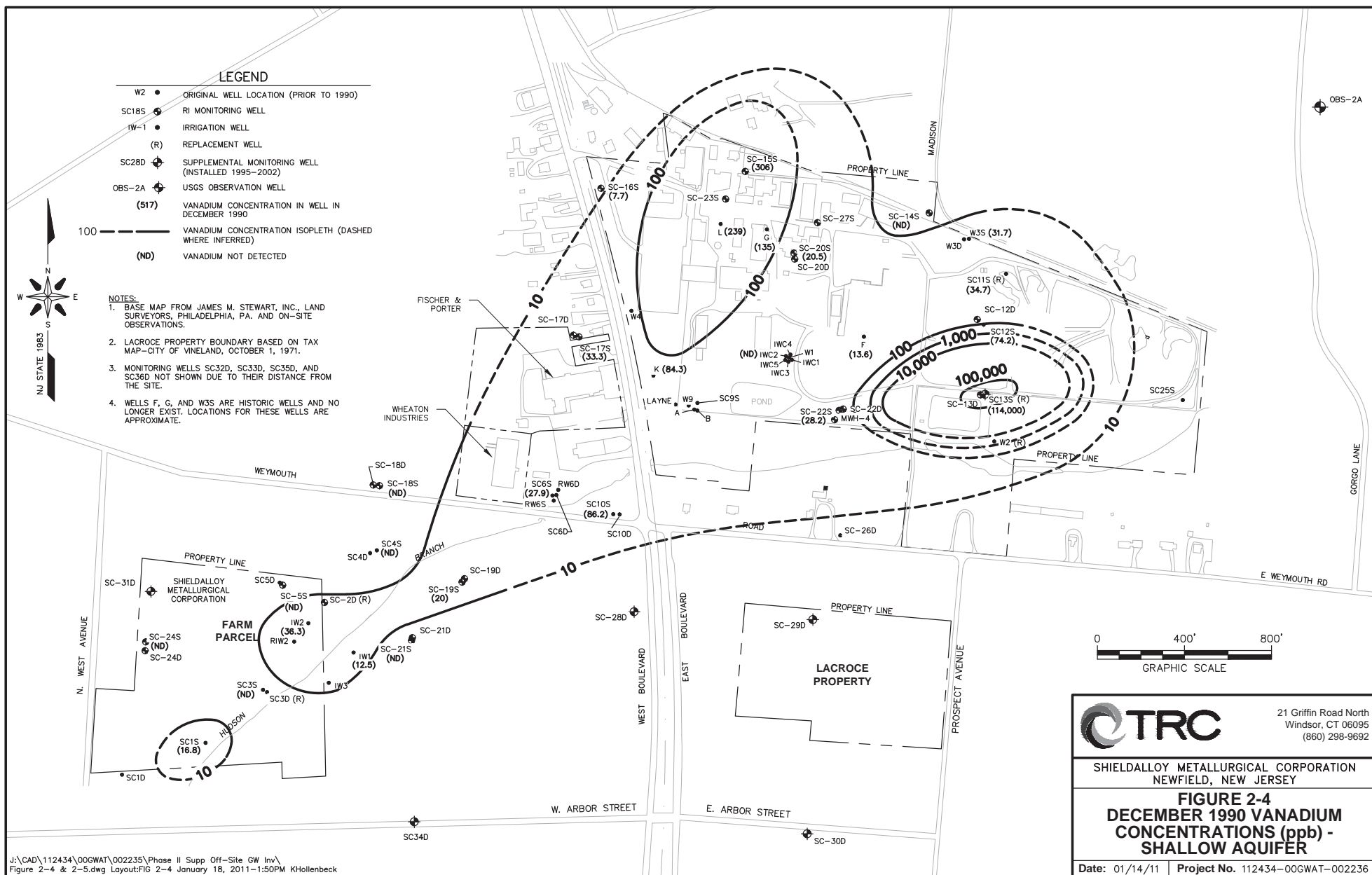
LACROCE PROPERTY BOUNDARY BASED ON
TAX MAP—CITY OF VINELAND, OCTOBER 1,
1971.

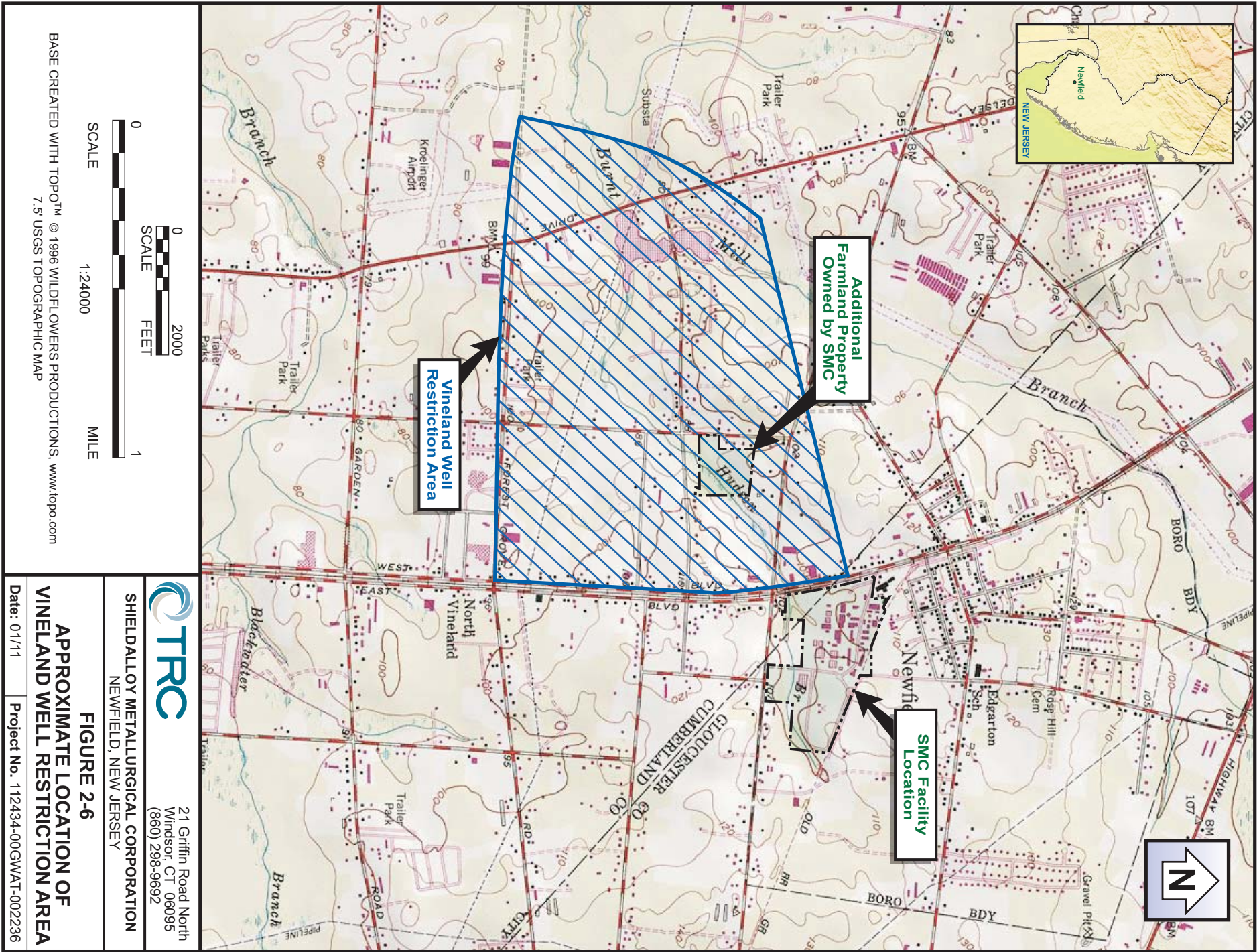
ORTHOPHOTOS FROM NEW JERSEY IMAGE
WAREHOUSE WEB SITE, PUBLISHED 10/2008
WITH PHOTOS TAKEN IN 2007 & 2008.

NOTES: MONITORING WELL SC32D WAS
INSTALLED ADJACENT TO VP-5 IN 2007.
MONITORING WELLS SC33D, SC34D, SC35D,
AND SC36D WERE INSTALLED ADJACENT TO
VP-7, VP-8, VP-15A AND VP-13A,
RESPECTIVELY IN 2009.









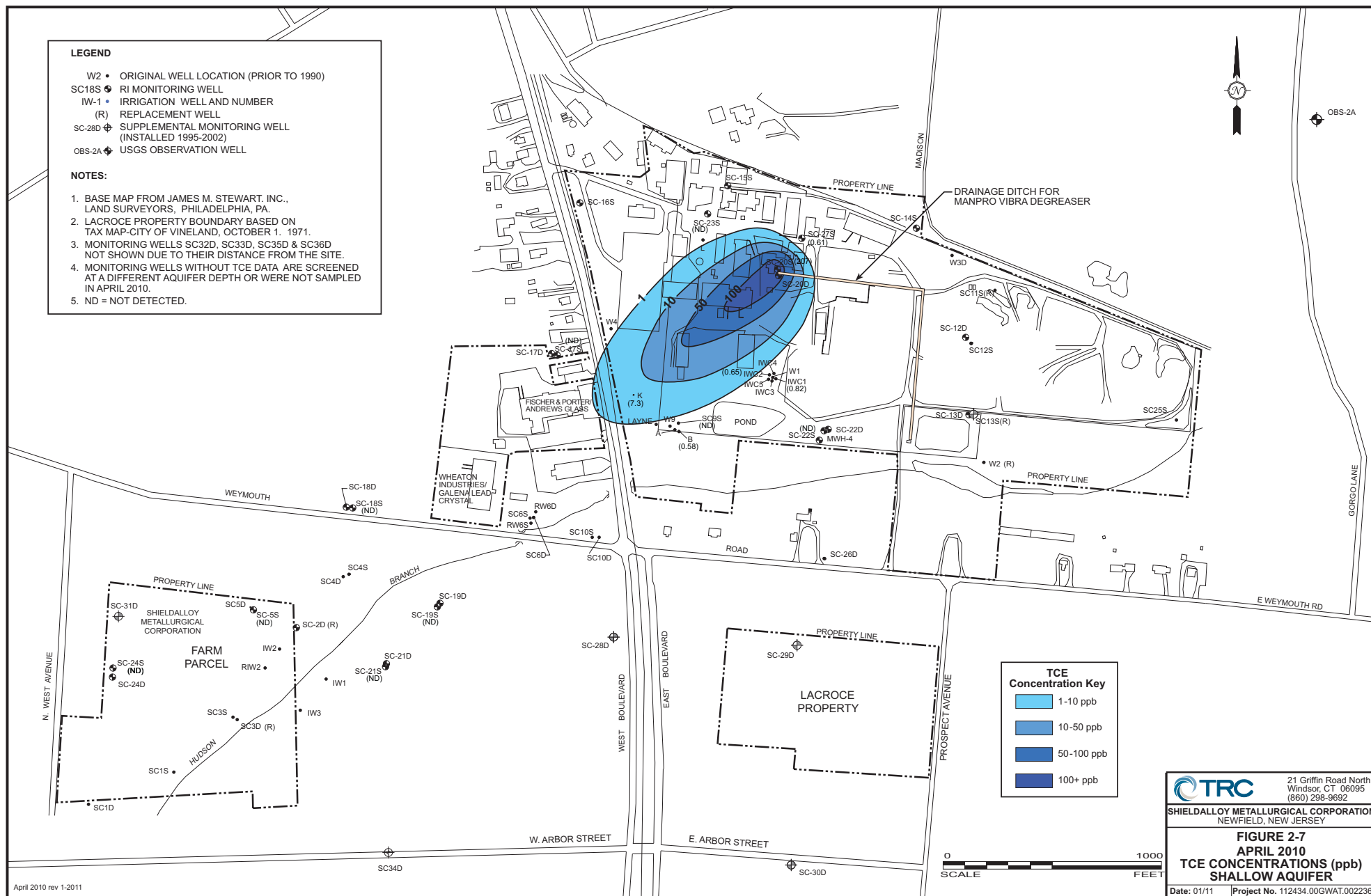


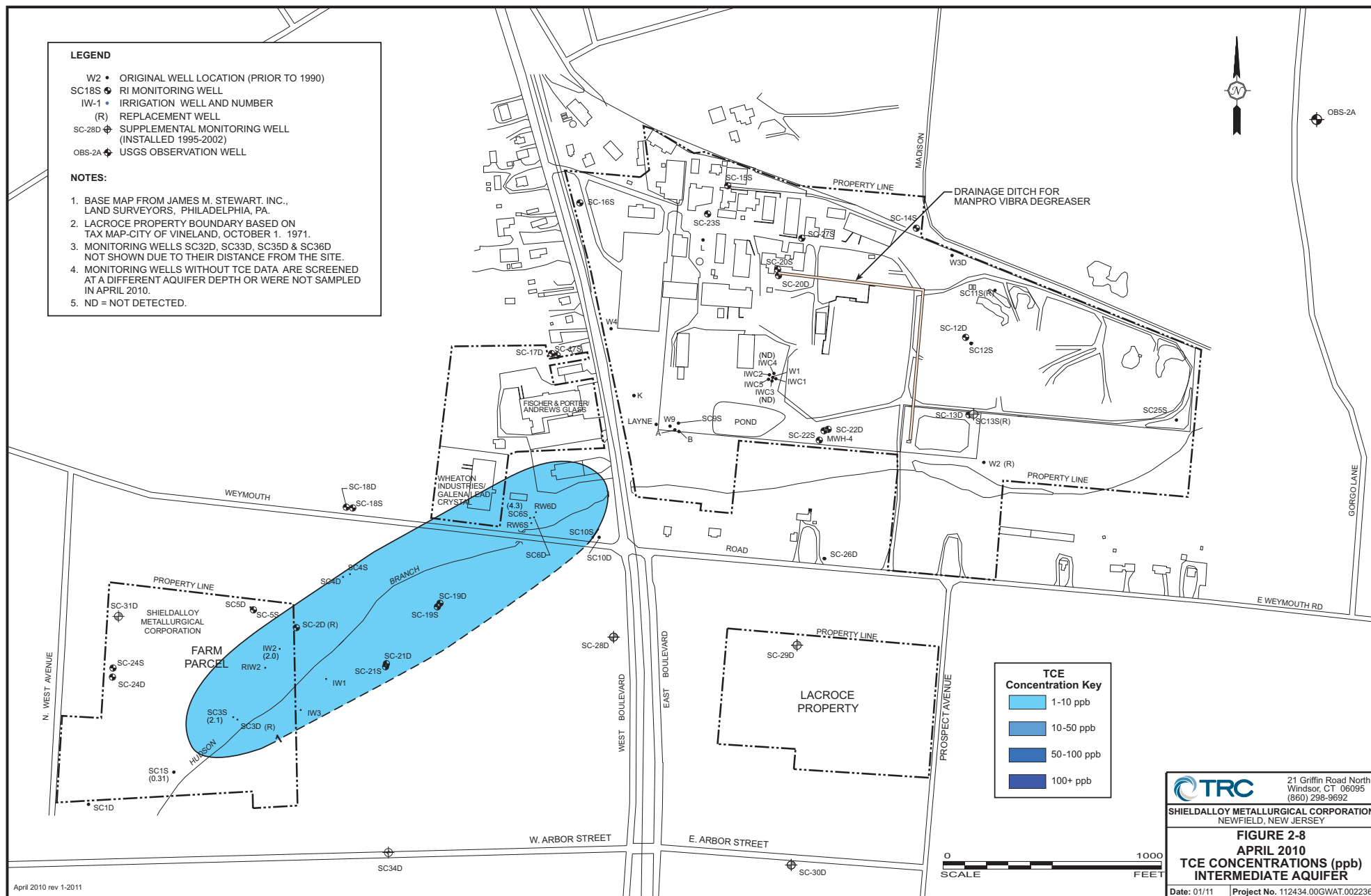
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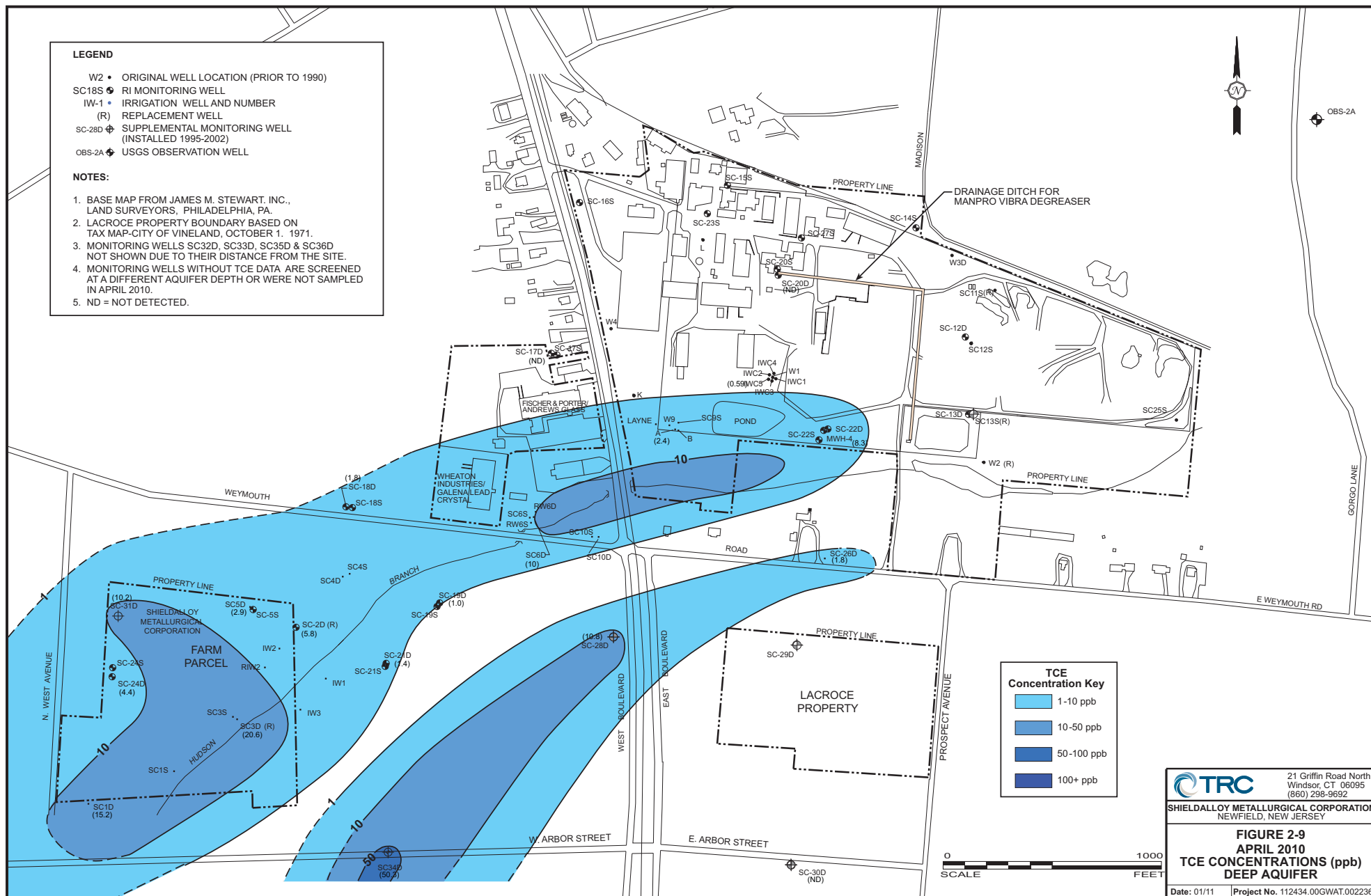
SHIELDALLOY METALLURGICAL CORPORATION
NEWFIELD, NEW JERSEY

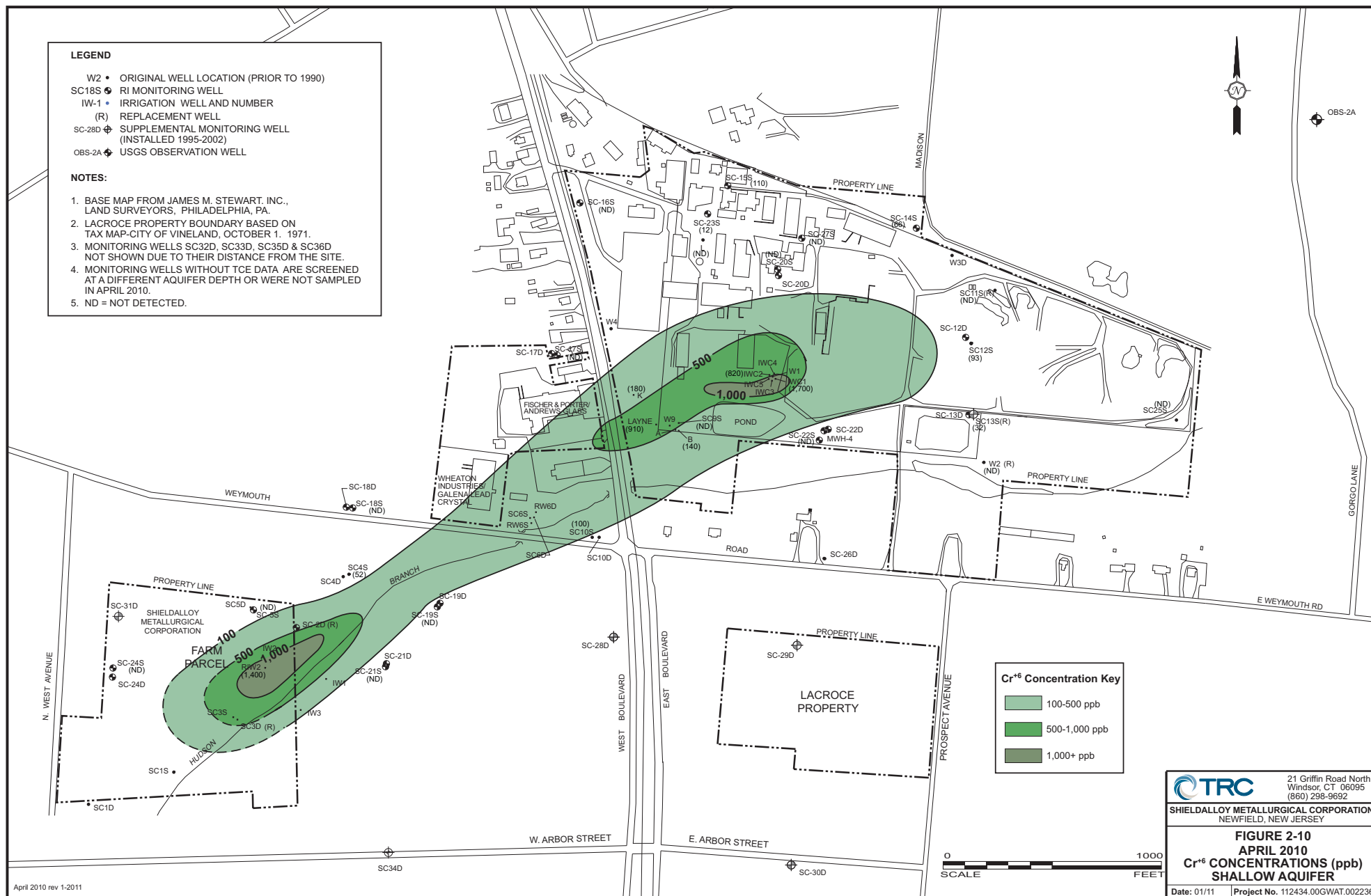
FIGURE 2-6
APPROXIMATE LOCATION OF
VINELAND WELL RESTRICTION AREA

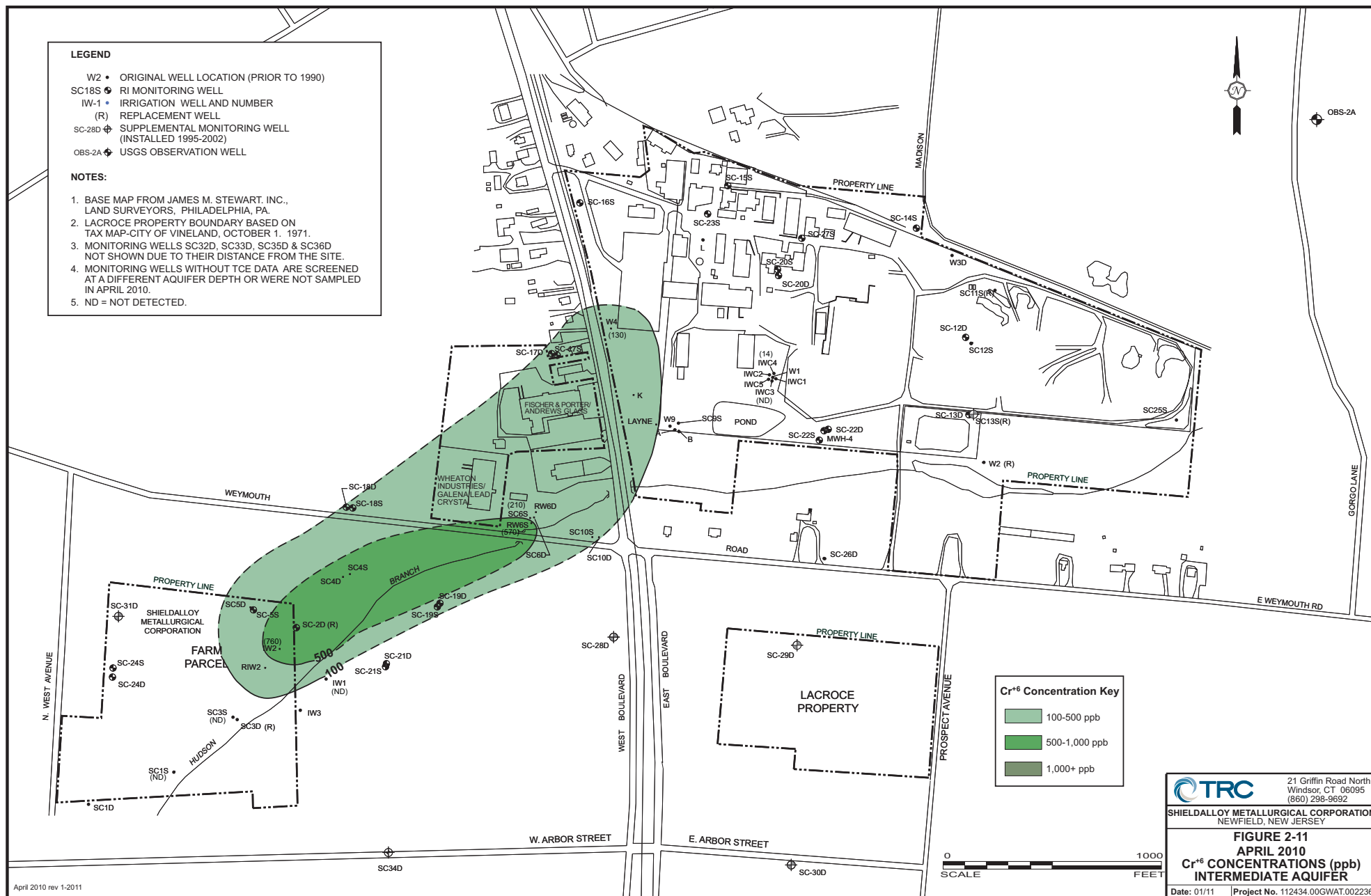
Date: 01/11 **Project No.** 112434-00GWAT-002236











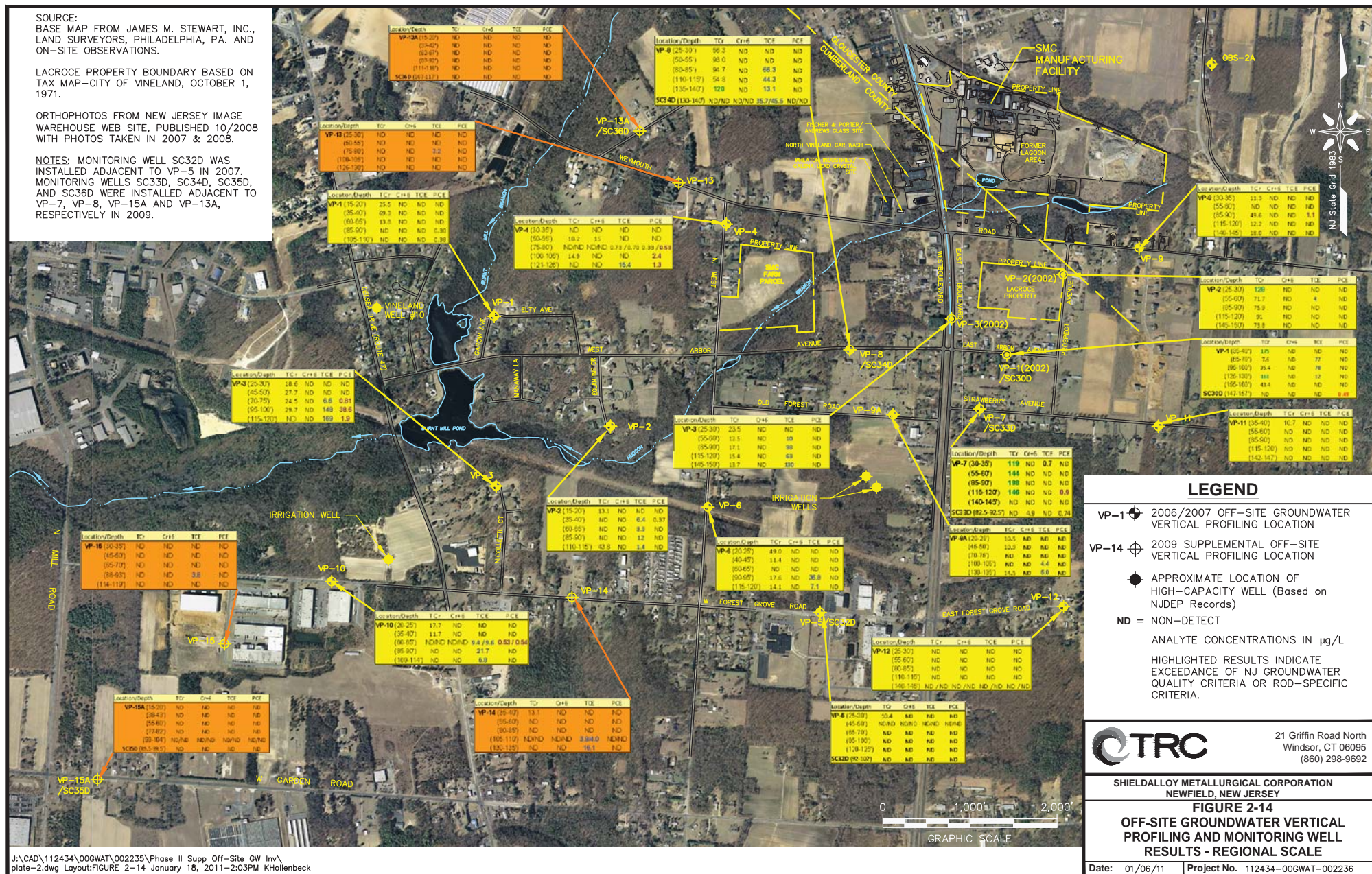


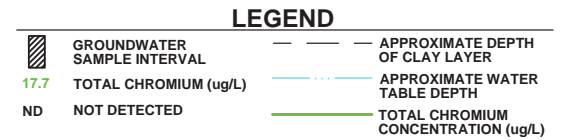
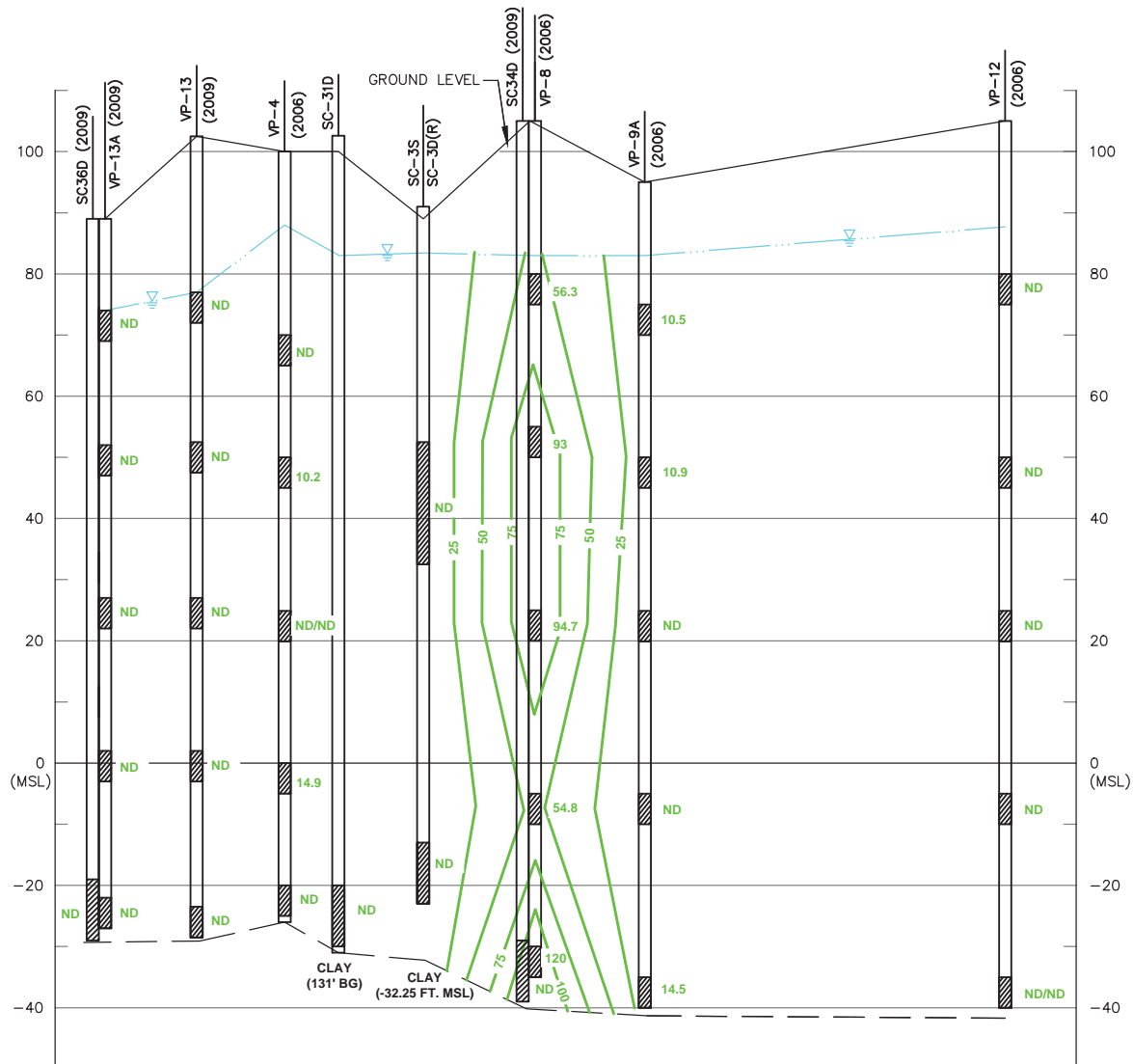
SOURCE:
BASE MAP FROM JAMES M. STEWART, INC.,
LAND SURVEYORS, PHILADELPHIA, PA. AND
ON-SITE OBSERVATIONS.

LACROCE PROPERTY BOUNDARY BASED ON
TAX MAP—CITY OF VINELAND, OCTOBER 1,
1971.

ORTHOPHOTOS FROM NEW JERSEY IMAGE
WAREHOUSE WEB SITE, PUBLISHED 10/2008
WITH PHOTOS TAKEN IN 2007 & 2008.

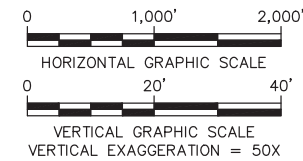
NOTES: MONITORING WELL SC32D WAS
INSTALLED ADJACENT TO VP-5 IN 2007.
MONITORING WELLS SC33D, SC34D, SC35D,
AND SC36D WERE INSTALLED ADJACENT TO
VP-7, VP-8, VP-15A AND VP-13A,
RESPECTIVELY IN 2009.





NOTES:

- 1) CLAY LAYER ENCOUNTERED AT VP-4, SC-31D AND SC-3D LOCATIONS
- 2) GROUND ELEVATIONS BASED ON 7.5' NEWFIELD, NJ USGS TOPOGRAPHIC MAP
- 3) TOTAL CHROMIUM SAMPLE RESULTS FOR SC-3S/3D AND SC-31D COLLECTED IN OCTOBER 2006.
- 4) PERMANENT MONITORING WELL INSTALLED AT VP-8 (SC34D) IN 2009. NO Cr DETECTED IN GROUNDWATER SAMPLE FROM SC34D, INDICATING THE TOTAL Cr DETECTED IN VP-8 WAS Cr⁺³ AND AN ARTIFACT OF HSA DRILLING TECHNIQUES, WHICH MOBILIZED SOILS WITH ADSORBED Cr⁺³.
- 5) PERMANENT MONITORING WELL INSTALLED AT VP-13A (SC36D) IN 2009.

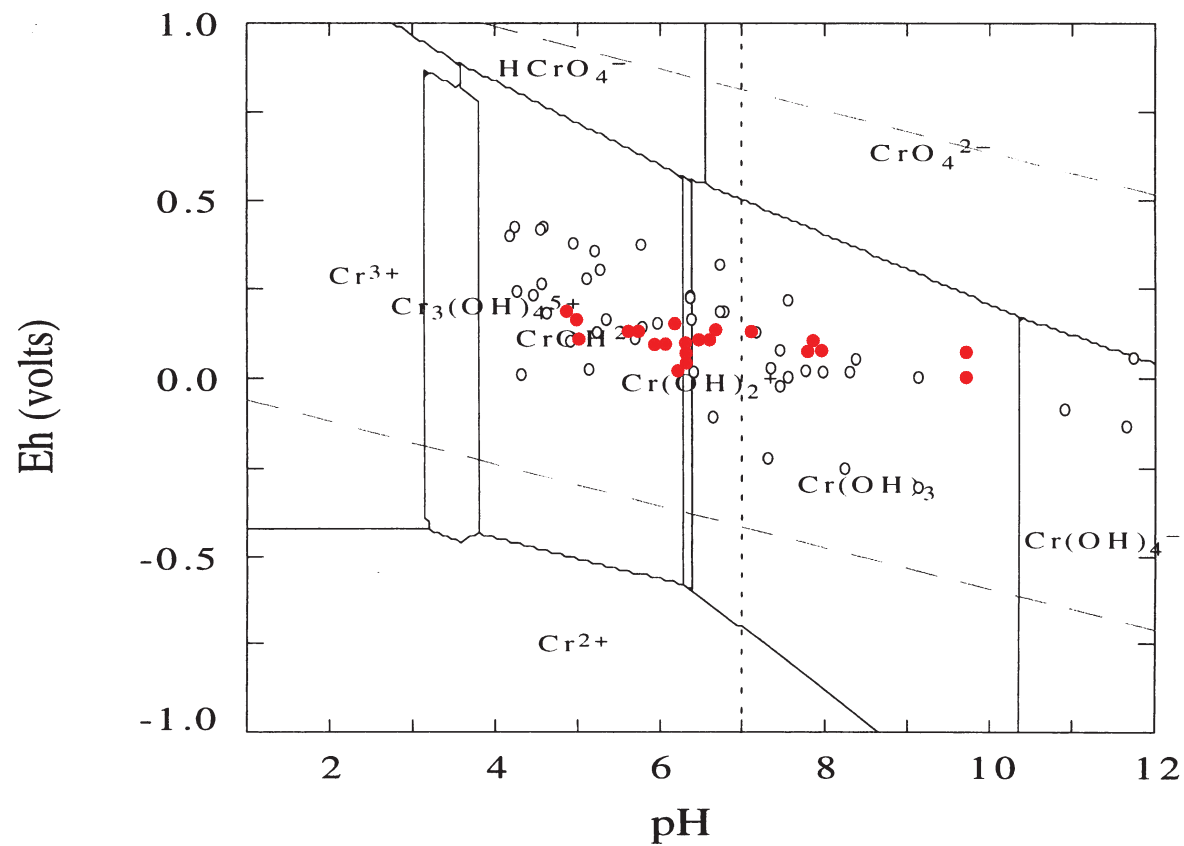


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SHIELDALLOY METALLURGICAL CORPORATION
NEWFIELD, NEW JERSEY

FIGURE 3-1
VERTICAL PROFILING CROSS SECTION
(VP-13A TO VP-12)
TOTAL CHROMIUM

Date: 01/06/11 | Project No. 112434-00GWAT-002236



$t = 25\text{ }^{\circ}\text{C}$

LEGEND

- July 2006 Monitoring Well Data Point
- November 2009 Monitoring Well Data Point



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SHIELDALLOY METALLURGICAL CORPORATION
NEWFIELD, NEW JERSEY

FIGURE 3-3
Eh-pH EQUILIBRIUM DIAGRAM
July 2006 and November 2009 Monitoring
Well Data Points

Date: 01/06/11

Project No. 112434-00GWAT-002236

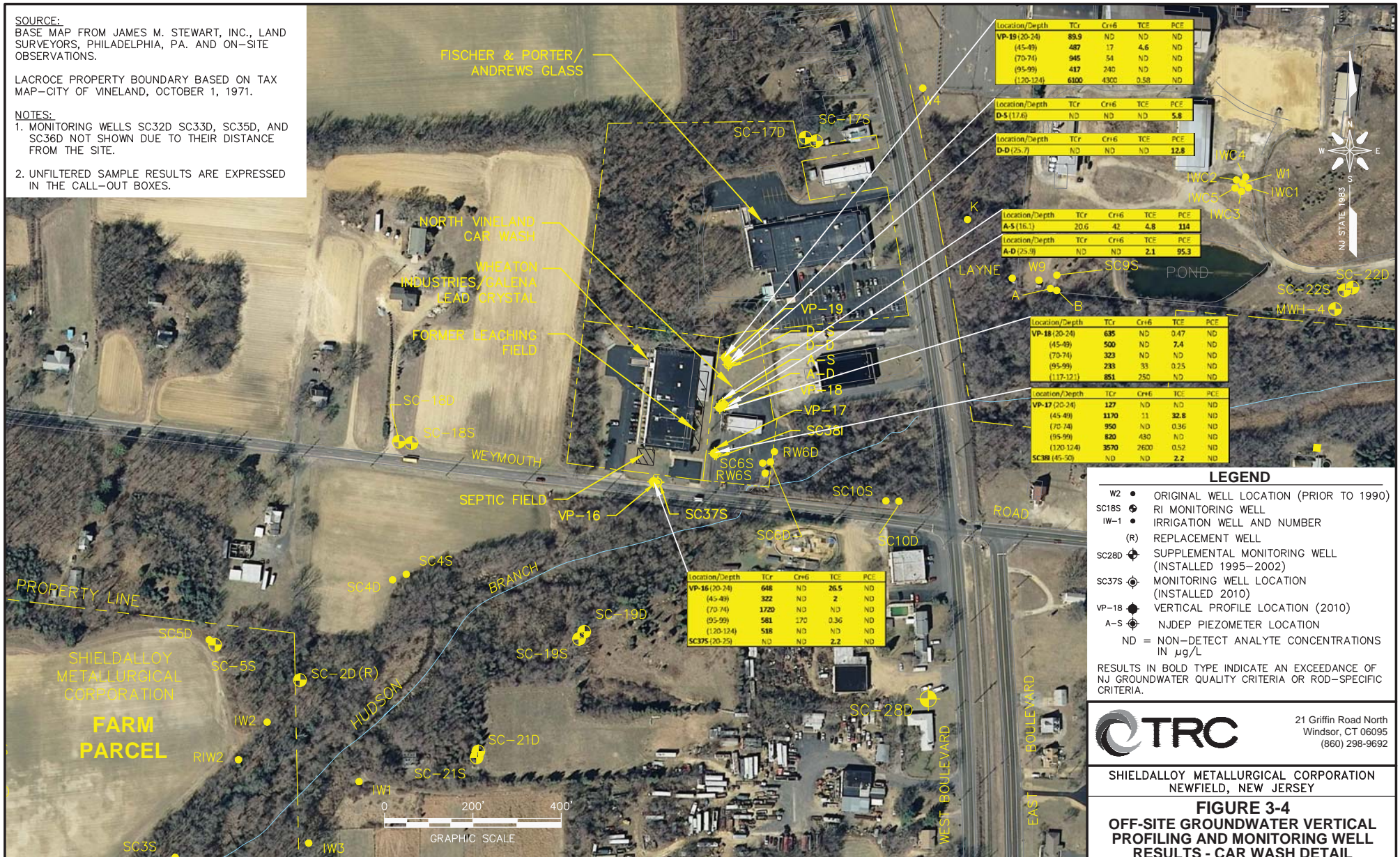
SOURCE:
BASE MAP FROM JAMES M. STEWART, INC., LAND
SURVEYORS, PHILADELPHIA, PA. AND ON-SITE
OBSERVATIONS.

LACROCE PROPERTY BOUNDARY BASED ON TAX
MAP—CITY OF VINELAND, OCTOBER 1, 1971.

NOTES:

1. MONITORING WELLS SC32D SC33D, SC35D, AND
SC36D NOT SHOWN DUE TO THEIR DISTANCE
FROM THE SITE.

2. UNFILTERED SAMPLE RESULTS ARE EXPRESSED
IN THE CALL-OUT BOXES.

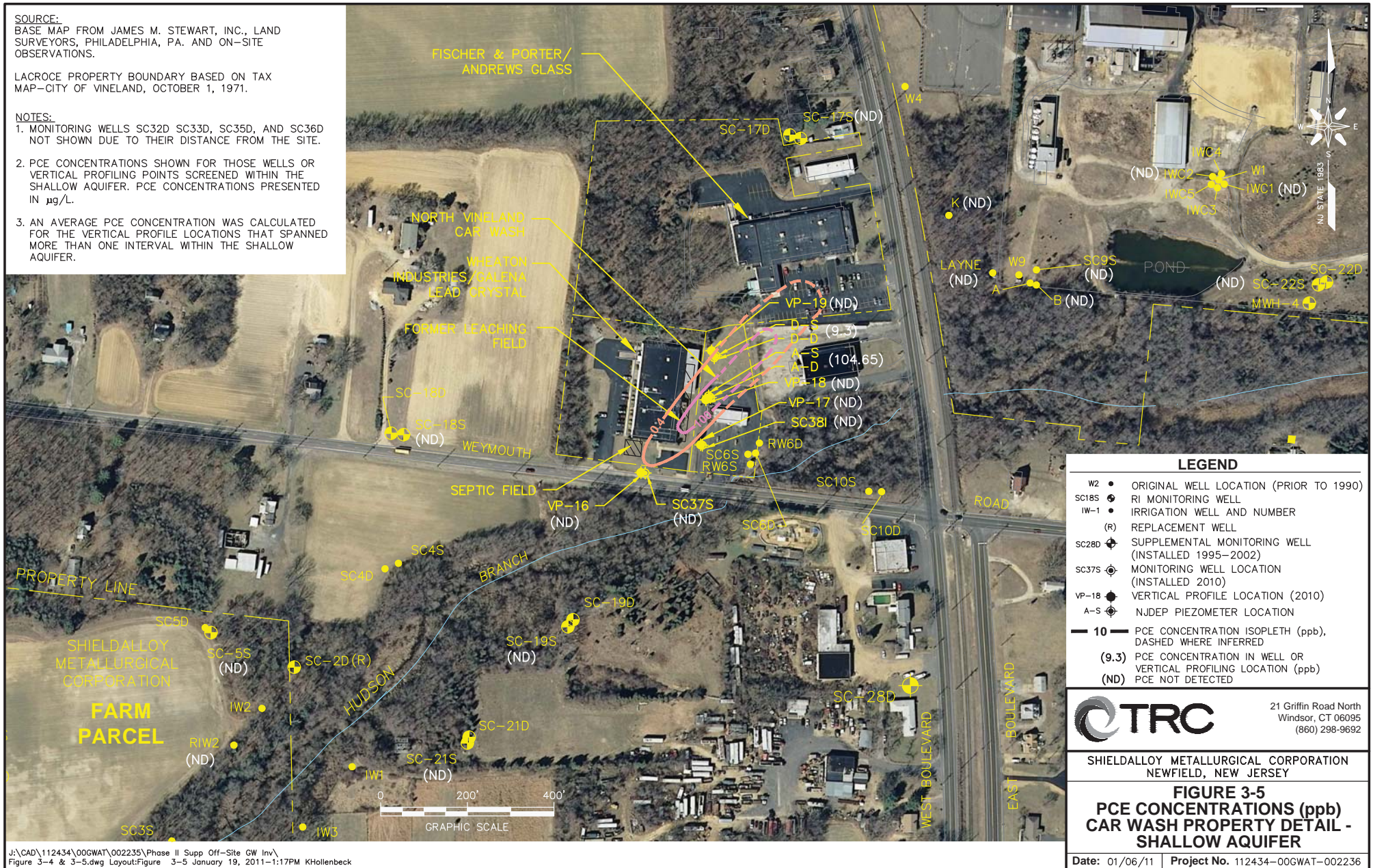


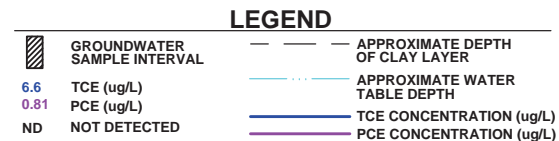
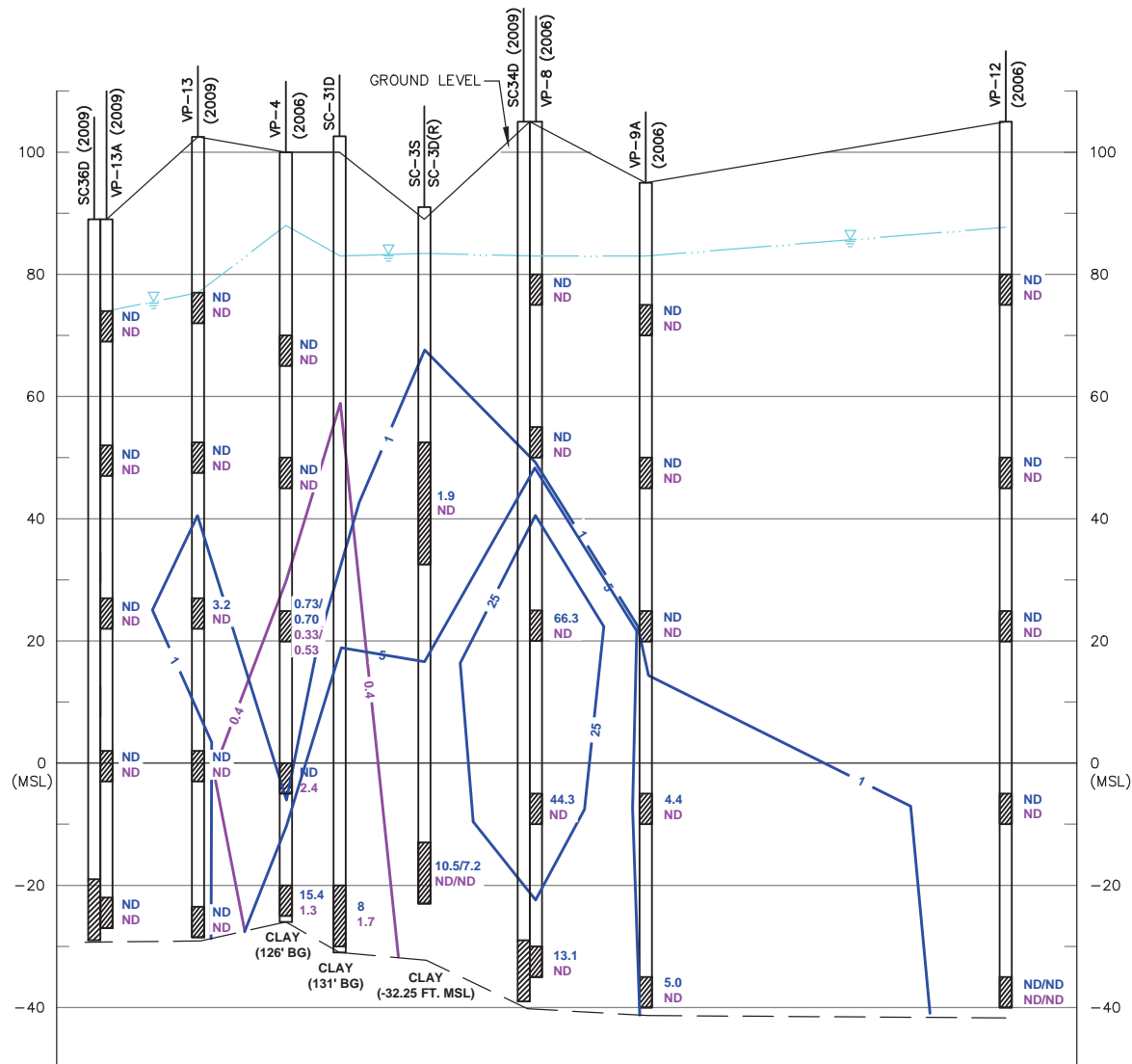
SOURCE:
 BASE MAP FROM JAMES M. STEWART, INC., LAND
 SURVEYORS, PHILADELPHIA, PA. AND ON-SITE
 OBSERVATIONS.

LACROCE PROPERTY BOUNDARY BASED ON TAX
 MAP—CITY OF VINELAND, OCTOBER 1, 1971.

NOTES:

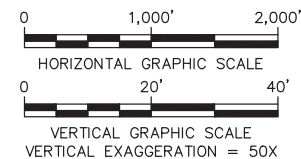
1. MONITORING WELLS SC32D, SC33D, SC35D, AND SC36D
 NOT SHOWN DUE TO THEIR DISTANCE FROM THE SITE.
2. PCE CONCENTRATIONS SHOWN FOR THOSE WELLS OR
 VERTICAL PROFILING POINTS SCREENED WITHIN THE
 SHALLOW AQUIFER. PCE CONCENTRATIONS PRESENTED
 IN $\mu\text{g/L}$.
3. AN AVERAGE PCE CONCENTRATION WAS CALCULATED
 FOR THE VERTICAL PROFILE LOCATIONS THAT SPANNED
 MORE THAN ONE INTERVAL WITHIN THE SHALLOW
 AQUIFER.





NOTES:

- 1) CLAY LAYER ENCOUNTERED AT VP-4, SC-31D AND SC-3D LOCATIONS
- 2) GROUND ELEVATIONS BASED ON 7.5' NEWFIELD, NJ USGS TOPOGRAPHIC MAP
- 3) TCE AND PCE SAMPLE RESULTS FOR SC-3S/3D AND SC-31D COLLECTED IN OCTOBER 2006.
- 4) PERMANENT MONITORING WELLS INSTALLED AT VP-8 (SC34D) AND VP-13A (SC36D) IN 2009.



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(860) 298-9692

SHIELDALLOY METALLURGICAL CORPORATION
NEWFIELD, NEW JERSEY

**FIGURE 4-2
VERTICAL PROFILING CROSS SECTION
(VP-13A TO VP-12)
PCE & TCE**

Date: 01/06/11

Project No. 112434-00GWAT-002236

FIGURE 4-3
TCE CONCENTRATIONS (DEEP AQUIFER)
APRIL 2001 - OCTOBER 2010
OU1 Supplemental RI
Shieldalloy Metallurgical Corporation
Newfield, New Jersey

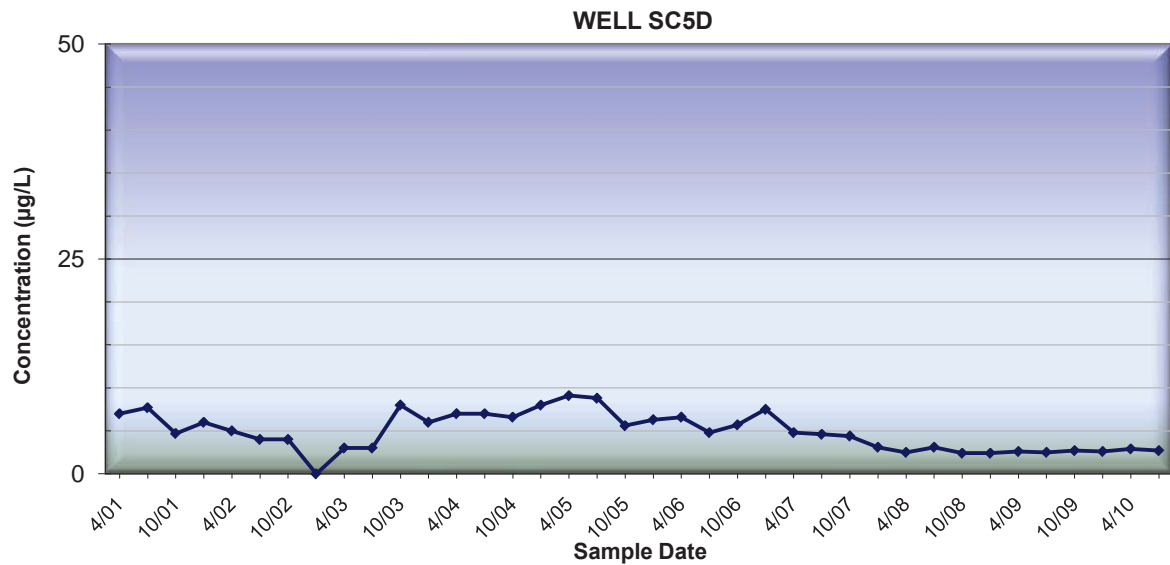
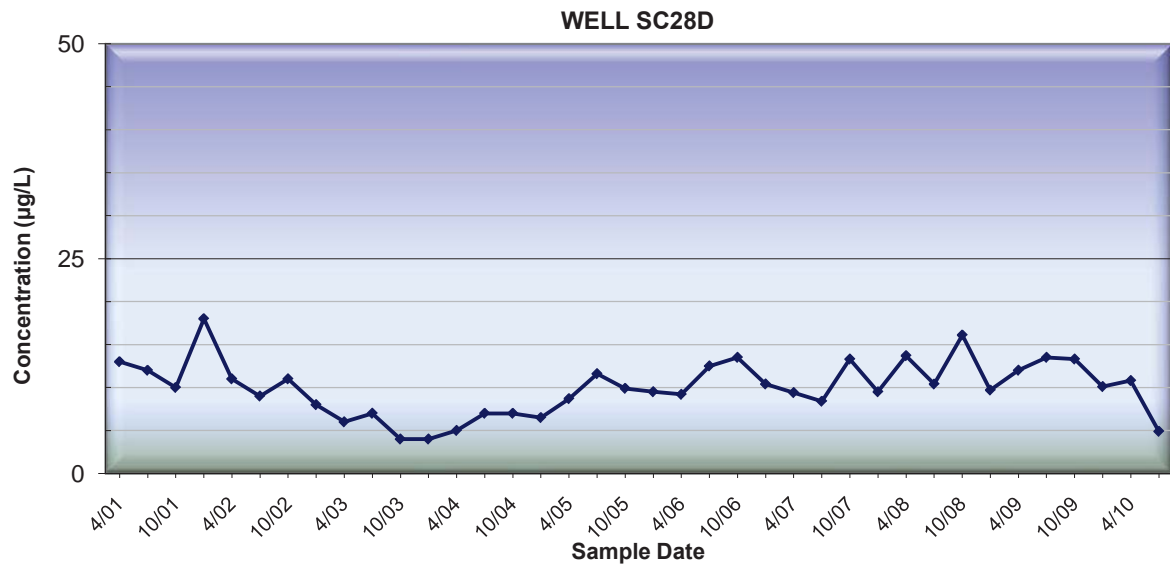
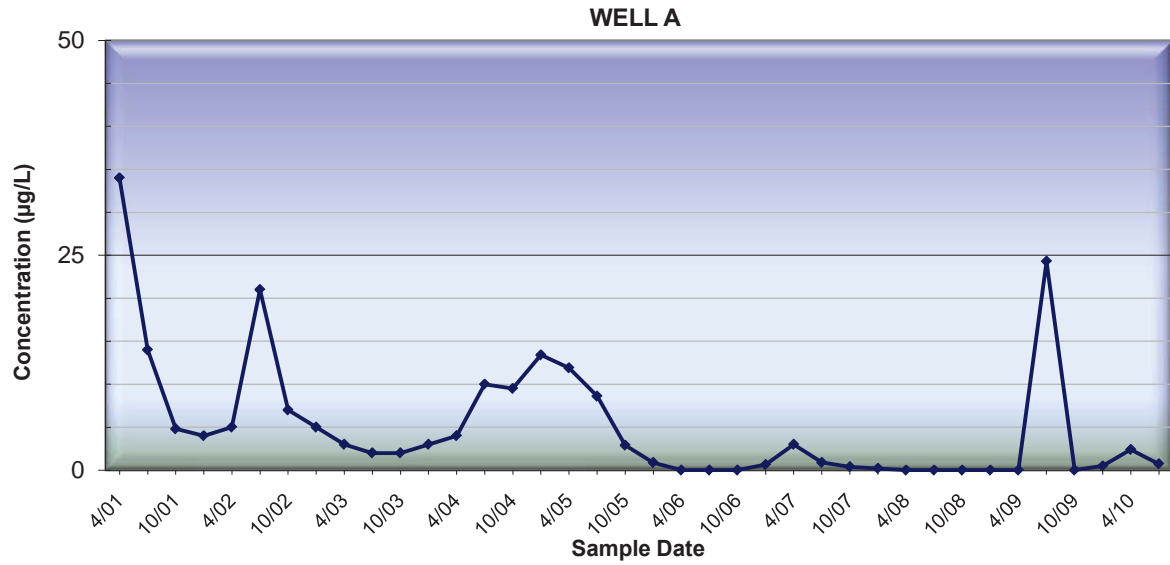
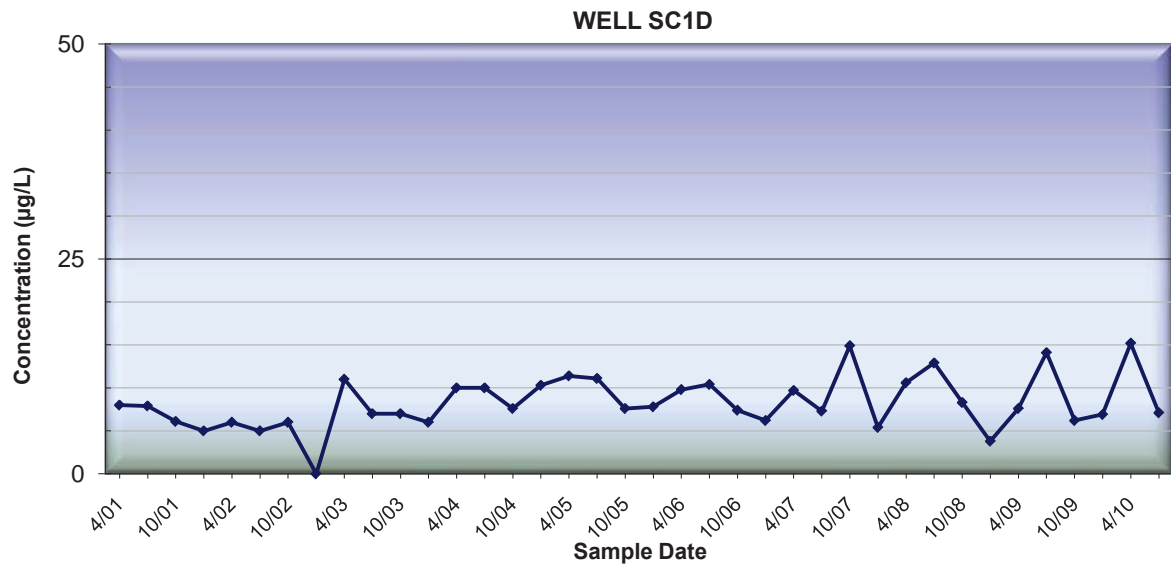
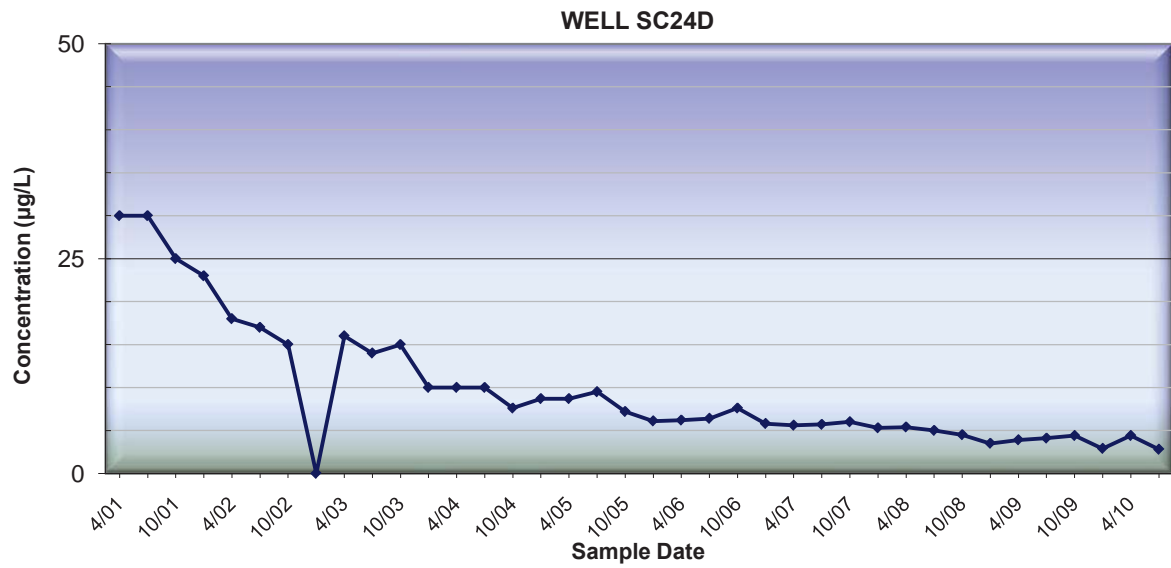
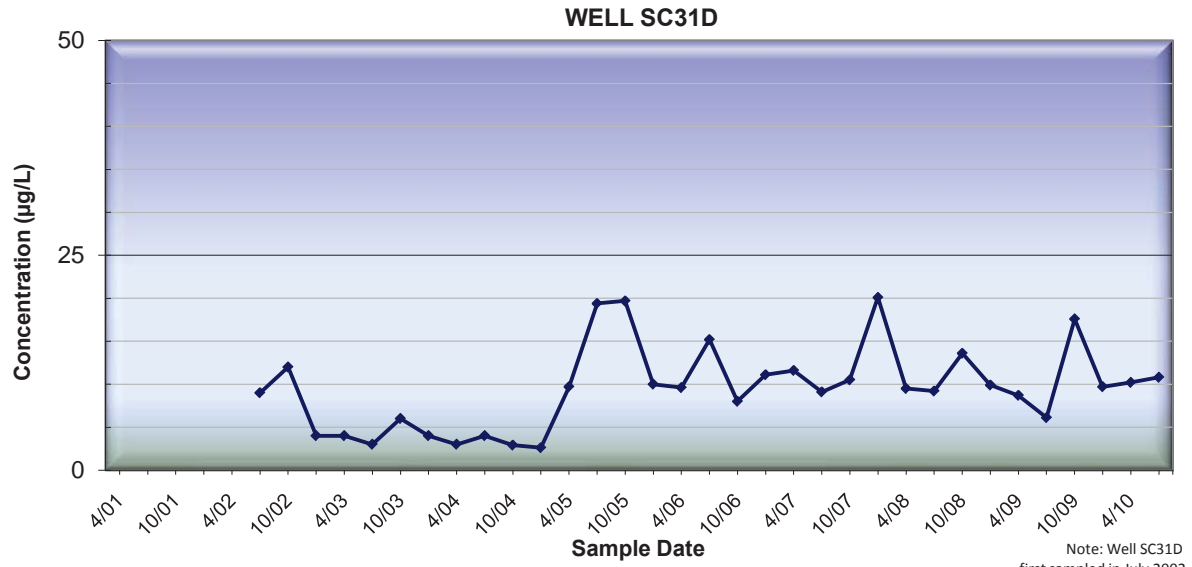


FIGURE 4-3
TCE CONCENTRATIONS (DEEP AQUIFER)
APRIL 2001 - OCTOBER 2010
OU1 Supplemental RI
Metallurgical Corporation
Newfield, New Jersey



SOURCE:
BASE MAP FROM JAMES M. STEWART, INC.,
LAND SURVEYORS, PHILADELPHIA, PA. AND
ON-SITE OBSERVATIONS.

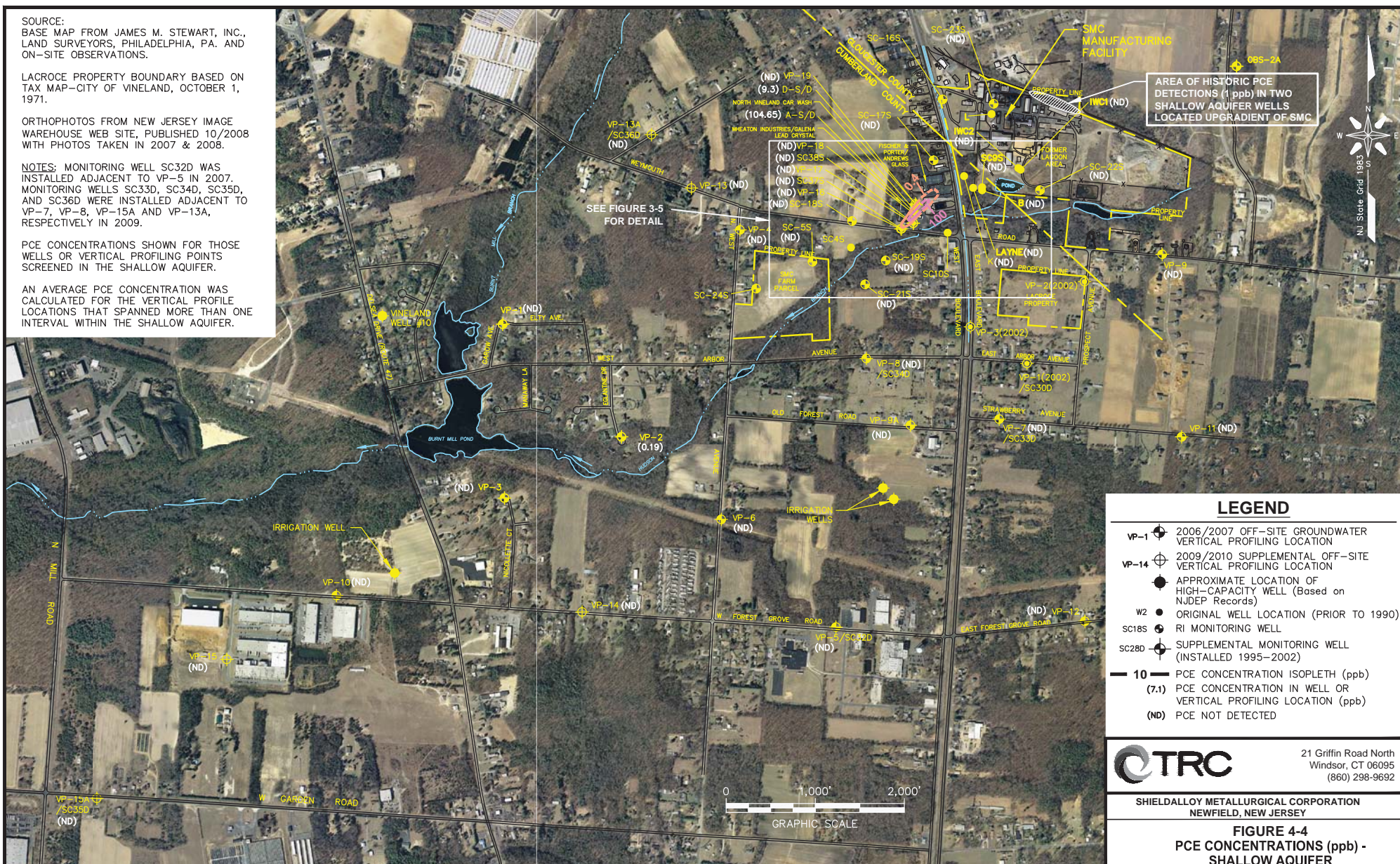
LACROCE PROPERTY BOUNDARY BASED ON
TAX MAP-CITY OF VINELAND, OCTOBER 1,
1971.

ORTHOPHOTOS FROM NEW JERSEY IMAGE
WAREHOUSE WEB SITE, PUBLISHED 10/2008
WITH PHOTOS TAKEN IN 2007 & 2008.

NOTES: MONITORING WELL SC32D WAS
INSTALLED ADJACENT TO VP-5 IN 2007.
MONITORING WELLS SC33D, SC34D, SC35D,
AND SC36D WERE INSTALLED ADJACENT TO
VP-7, VP-8, VP-15A AND VP-13A,
RESPECTIVELY IN 2009.

PCE CONCENTRATIONS SHOWN FOR THOSE
WELLS OR VERTICAL PROFILING LOCATIONS
SCREENED IN THE SHALLOW AQUIFER.

AN AVERAGE PCE CONCENTRATION WAS
CALCULATED FOR THE VERTICAL PROFILE
LOCATIONS THAT SPANNED MORE THAN ONE
INTERVAL WITHIN THE SHALLOW AQUIFER.



SOURCE:
BASE MAP FROM JAMES M. STEWART, INC.,
LAND SURVEYORS, PHILADELPHIA, PA. AND
ON-SITE OBSERVATIONS.

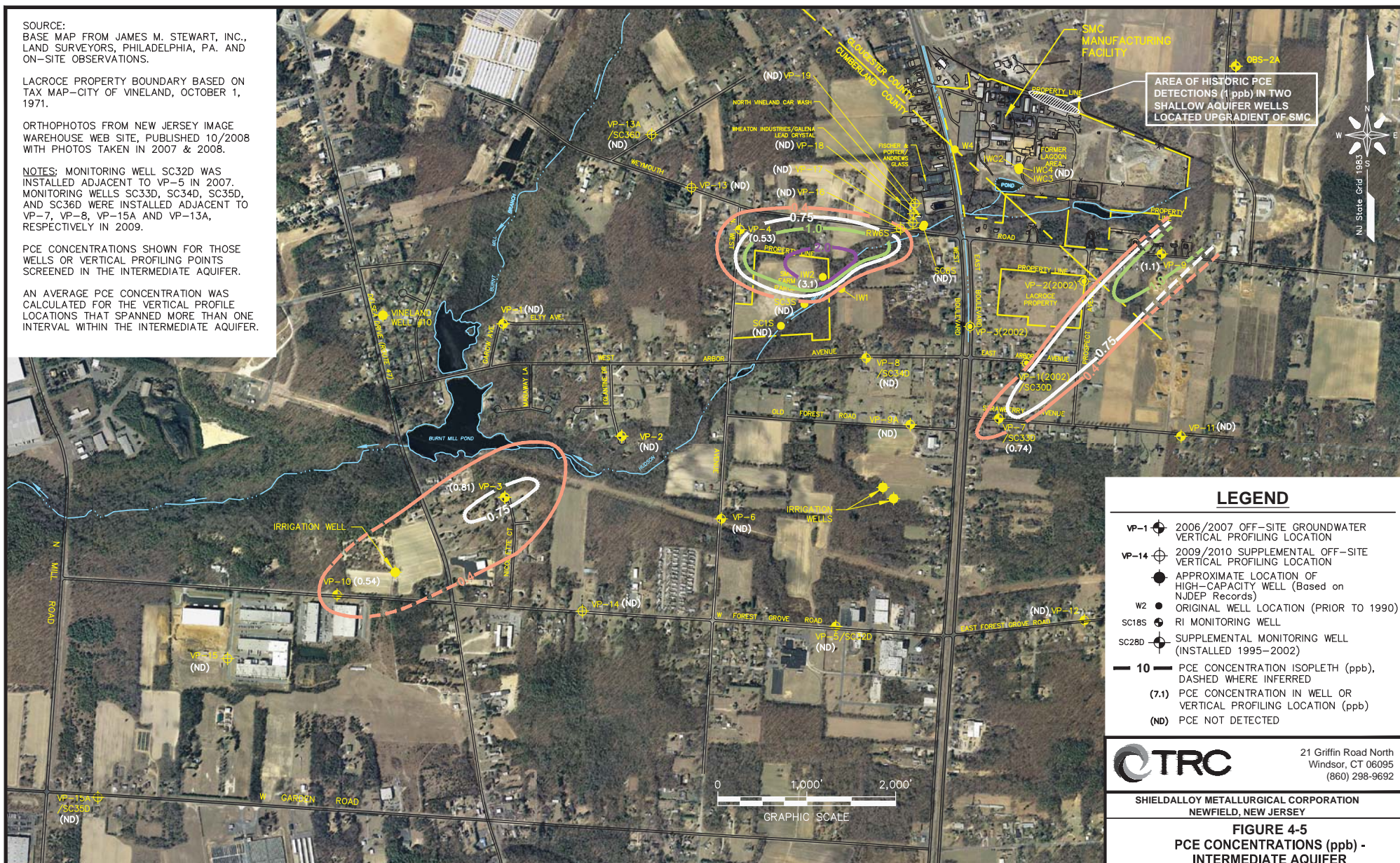
LACROCE PROPERTY BOUNDARY BASED ON
TAX MAP-CITY OF VINELAND, OCTOBER 1,
1971.

ORTHOPHOTOS FROM NEW JERSEY IMAGE
WAREHOUSE WEB SITE, PUBLISHED 10/2008
WITH PHOTOS TAKEN IN 2007 & 2008.

NOTES: MONITORING WELL SC32D WAS
INSTALLED ADJACENT TO VP-5 IN 2007.
MONITORING WELLS SC33D, SC34D, SC35D,
AND SC36D WERE INSTALLED ADJACENT TO
VP-7, VP-8, VP-15A AND VP-13A,
RESPECTIVELY IN 2009.

PCE CONCENTRATIONS SHOWN FOR THOSE
WELLS OR VERTICAL PROFILING POINTS
SCREENED IN THE INTERMEDIATE AQUIFER.

AN AVERAGE PCE CONCENTRATION WAS
CALCULATED FOR THE VERTICAL PROFILE
LOCATIONS THAT SPANNED MORE THAN ONE
INTERVAL WITHIN THE INTERMEDIATE AQUIFER.



LEGEND

- VP-1 2006/2007 OFF-SITE GROUNDWATER VERTICAL PROFILING LOCATION
- VP-14 2009/2010 SUPPLEMENTAL OFF-SITE VERTICAL PROFILING LOCATION
- APPROXIMATE LOCATION OF HIGH-CAPACITY WELL (Based on NJDEP Records)
- W2 ● ORIGINAL WELL LOCATION (PRIOR TO 1990)
- SC18S ● RI MONITORING WELL
- SC28D ● SUPPLEMENTAL MONITORING WELL (INSTALLED 1995-2002)
- 10 PCE CONCENTRATION ISOPLETH (ppb), DASHED WHERE INFERRED
- (7.1) PCE CONCENTRATION IN WELL OR VERTICAL PROFILING LOCATION (ppb)
- (ND) PCE NOT DETECTED



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NEWFIELD, NEW JERSEY

FIGURE 4-5 PCE CONCENTRATIONS (ppb) - INTERMEDIATE AQUIFER

Date: 01/06/11 Project No. 112434-00GWAT-002236

SOURCE:
BASE MAP FROM JAMES M. STEWART, INC.,
LAND SURVEYORS, PHILADELPHIA, PA. AND
ON-SITE OBSERVATIONS.

LACROCE PROPERTY BOUNDARY BASED ON
TAX MAP-CITY OF VINELAND, OCTOBER 1,
1971.

ORTHOPHOTOS FROM NEW JERSEY IMAGE
WAREHOUSE WEB SITE, PUBLISHED 10/2008
WITH PHOTOS TAKEN IN 2007 & 2008.

NOTES: MONITORING WELL SC32D WAS
INSTALLED ADJACENT TO VP-5 IN 2007.
MONITORING WELLS SC33D, SC34D, SC35D,
AND SC36D WERE INSTALLED ADJACENT TO
VP-7, VP-8, VP-15A AND VP-13A,
RESPECTIVELY IN 2009.

PCE CONCENTRATIONS SHOWN FOR THOSE
WELLS OR VERTICAL PROFILING POINTS
SCREENED IN THE DEEP AQUIFER.

AN AVERAGE PCE CONCENTRATION WAS
CALCULATED FOR THE VERTICAL PROFILE
LOCATIONS THAT SPANNED MORE THAN ONE
INTERVAL WITHIN THE DEEP AQUIFER.

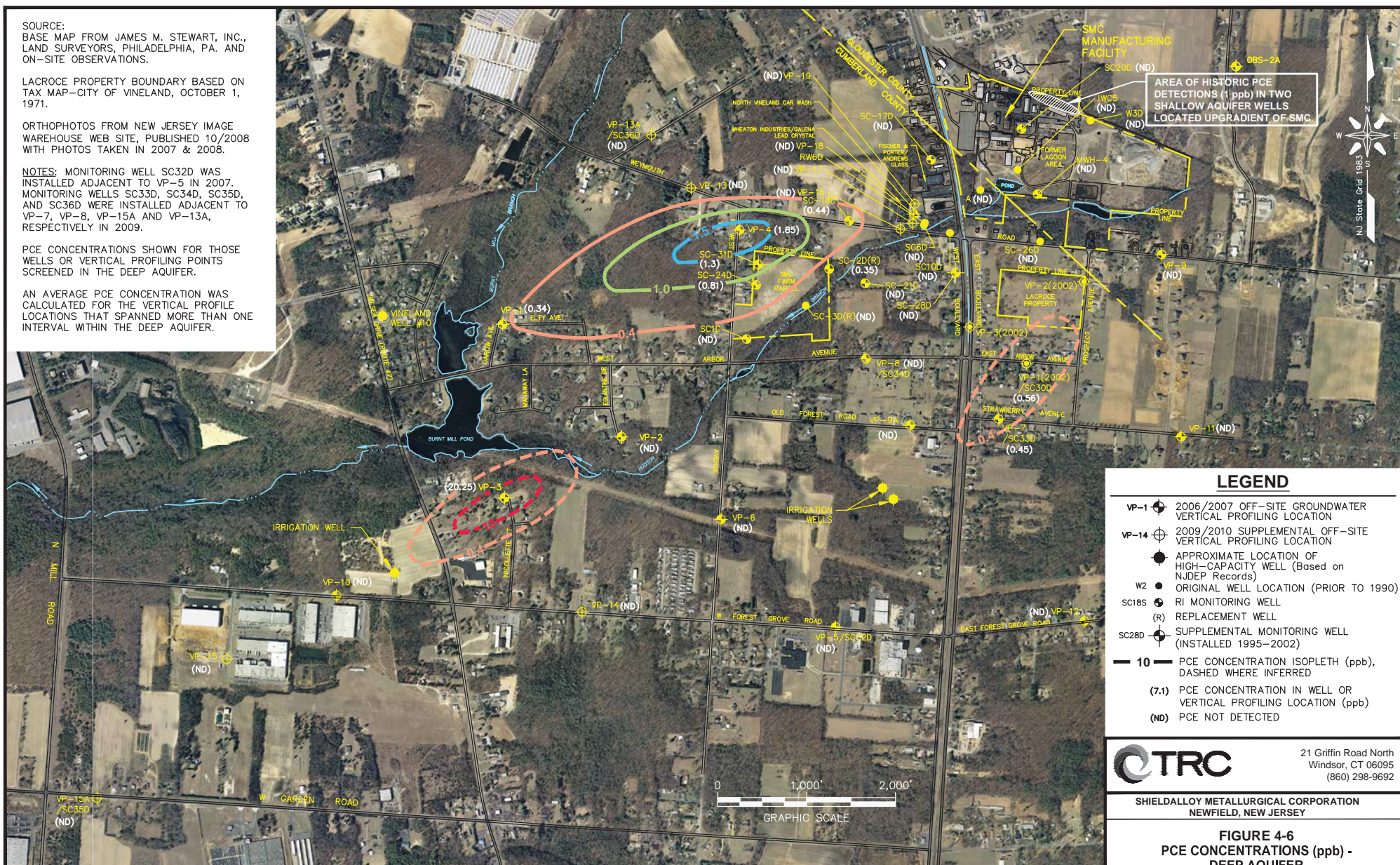
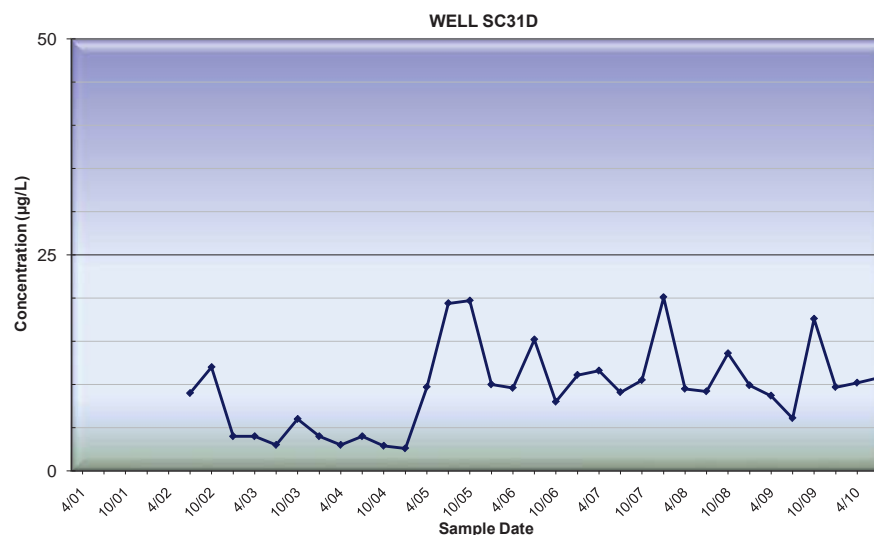
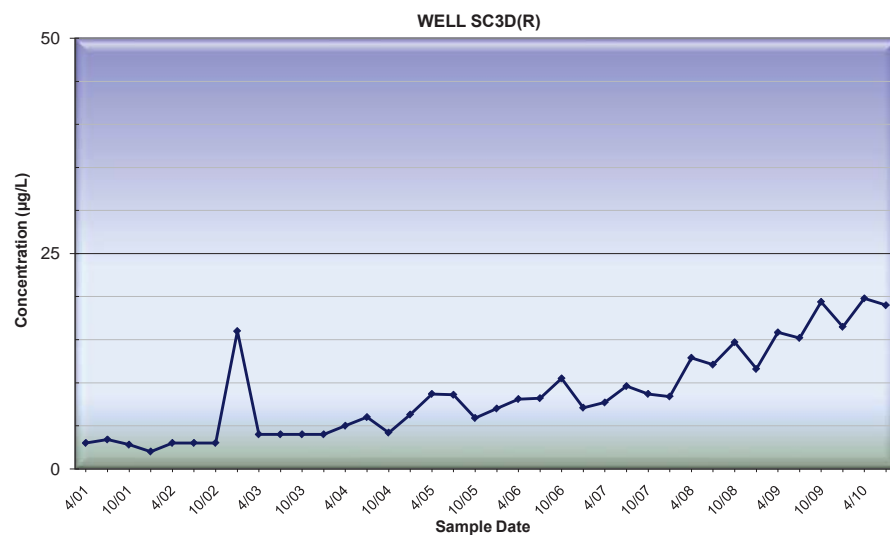
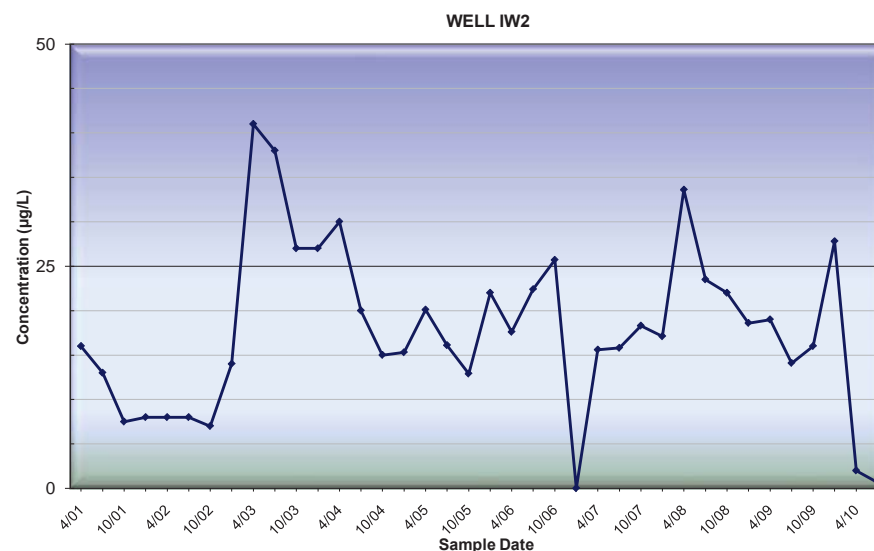
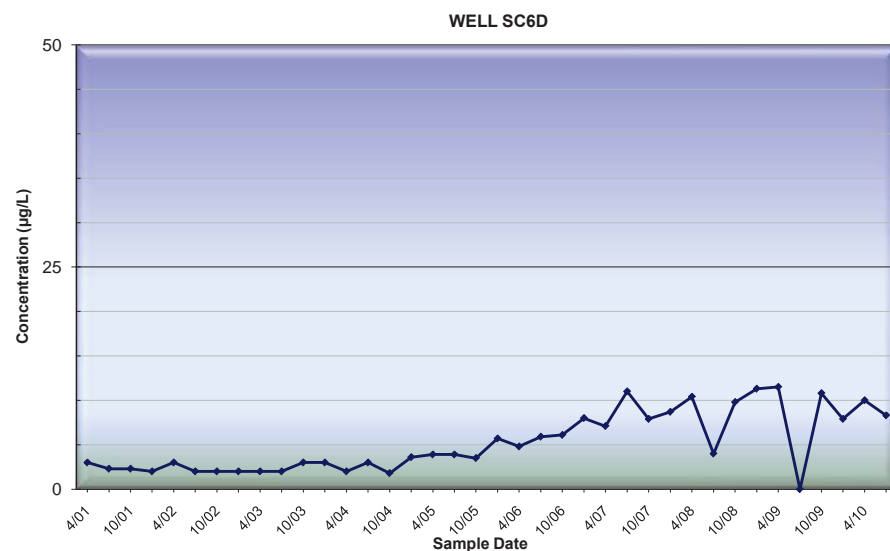


FIGURE 4-7
TCE CONCENTRATIONS IN WELLS DOWNGRADIENT OF POTENTIAL OFF-SITE SOURCE AREAS
APRIL 2001 - OCTOBER 2010
OU1 Supplemental RI
Shieldalloy Metallurgical Corporation
Newfield, New Jersey



Note: Well SC31D
first sampled in July 2002

APPENDIX A

POTENTIAL OFF-SITE SOURCE AREA FILE REVIEW

MEMORANDUM

To: Shieldalloy Metallurgical Corporation (SMC) Exit Strategy File--112434

Subject: Environmental File Review for Area Sites

Date: January 2011

Background

The SMC Site is located at 35 South West Boulevard in Newfield, New Jersey (Site). Groundwater generally flows in a south-westerly direction. SMC also owns a parcel referred to as the Farm Parcel, located approximately ½ mile southwest of the Site. SMC operates groundwater extraction wells on the Site, at a car wash on Weymouth Road (1/4 mile southwest of the Site), and at the Farm Parcel to contain and treat groundwater contaminated with trichloroethylene (TCE) and chromium.

As a component of the Phase II Remedial Investigation (RI), TRC performed environmental file reviews for properties in the SMC Site area. The identification of relevant environmental files was facilitated with the use of a database search of the area (EDR – March 2007).

TRC submitted a Freedom of Information Act (FOIA) request to the Environmental Protection Agency (EPA) in December 2009. The EPA files indicated that the State of New Jersey was the lead agency at the time and that the EPA had no additional files.

Based on the database findings, TRC submitted Office of Public Records Act (OPRA) requests to the New Jersey Department of Environmental Protection (NJDEP) in January 2010 and visited the NJDEP file room to review available records on February 18 and 25, and March 3, 2010.

NJDEP environmental files exist for regional groundwater issues, and specific off-site properties, as discussed below. A map showing the Site and off-site properties of interest is included as Figure 1.

Regional groundwater findings, as well as site-specific findings from the NJDEP file review are discussed below.

Regional Groundwater

Reference Document(s):

- Attachment 1: July 21, 1994 NJDEP Memorandum to William Dunfee, Supervisor NJDEP Southern Field Office (SFO); Subject: Northwest Vineland Groundwater Contamination Case

Other Reference:

- Telecon, March 29, 2010 between Joe Vetrano, TRC and Bob Fortz, City of Vineland Sewage Authority.

According to the 1994 NJDEP memo, Attachment 1, in 1987 the NJDEP identified an area in North Vineland, Cumberland County, NJ that exhibited volatile organic contamination (VOC) in potable wells approximately 3,000 feet west of the SMC Site (cross gradient). The contaminants of concern were tetrachloroethylene (PCE), TCE, 1,2-dichloroethylene (1,2-DCE), and 1,1,1-trichloroethane (TCA) which impacted an area containing 152 residential wells. The highest contaminant levels for these constituents detected in any well were 90 ppb PCE; 1,200 ppb TCE; 7.5 ppb 1,2-DCE; and 2.1 ppb TCA. The New Jersey Spill Compensation Fund provided financing for public water supply construction within the delineated area, residential tie-ins, and a remediation system to a supply well.

Additionally, a hexavalent chromium (Cr+6) plume was identified. SMC was identified as the responsible party for the chromium.

NJDEP identified a number of Potential Responsible Parties (PRPs) for the VOC contamination, including potential source sites that are clustered at Weymouth Road and North West Boulevard, namely Fischer & Porter Company (Andrews Glass), Wheaton Industries (Galena Lead Crystal), Research Glass Company, SMC, Gelsi Auto Repair/Gelsi Mustang, Dauito's Express, Marshall Services Incorporated, Industrial Diesel, and North Vineland Car Wash.

According to a telephone conversation between TRC and Mr. Bob Fortz of the City of Vineland Sewage Authority, all addresses along Weymouth Road (east and west) and North West Boulevard within the City of Vineland utilize on-site septic systems. No public sewer exists in this area.

As a result of the NJDEP investigation, Fischer & Porter Co., Wheaton Industries, and Research Glass Company were issued New Jersey Pollution Discharge Elimination Permits (NJPDES) permits in order to monitor the discharge of pollutants into their respective septic systems.

Wheaton Industries 158 Weymouth Road

(AKA Wheaton USA, Galena Lead Crystal, Precision Plastic Model Company, Algroup Pharmaceuticals, Alcan of Canada, and Lawson Mardon Wheaton)

The Wheaton Site is located approximately 550 feet west-southwest of the SMC Site southwest property line and immediately west of the car wash extraction wells.

The following documents discuss the Wheaton Industries issues:

- Attachment 1: July 21, 1994 NJDEP Memorandum to William Dunfee, Supervisor NJDEP SFO; Subject: Northwest Vineland Groundwater Contamination Case
- Attachment 2: February 27, 2002 Internal NJDEP Memo from Nick Sodano to John Boyer regarding SMC data
- Attachment 3: March 2, 2005 Internal NJDEP email from Nick Sodano of NJDEP to Ellen Biaselli of Alcan
- Attachment 4: Undated (post 2005) internal NJDEP memo entitled North Vineland Groundwater Contamination, Vineland City, Cumberland County.
- Attachment 5: August 16, 2007 Memorandum from Jill Dunphy, Senior Geologist, New Jersey Bureau of Environmental Measures & Site Assessment (BEMSA) to Joseph Fanaroff, Deputy Attorney General, NJ Division of Law
- Attachment 6a: New Jersey Department of Environmental Quality Air Pollution Control Permit Program, Bureau of New Source Review, August 22, 1991 - Permit to Construct, Install or Alter Control Apparatus or Equipment.
- Attachment 6b: OPRA online information for the new Wheaton site at 30 Gorton Road, Millville, NJ.
- Attachment 7: Pollution Prevention Technology Profile - Trivalent Chromium Replacements for Hexavalent Chromium Plating, The Northeast Waste Management Officials' Association (NEMWOA), November 2003.
- Attachment 8: NCO Financial Systems, Inc., Property Report, Wheaton Industries, 158 W. Weymouth Rd., Vineland, NJ 08360, April 8, 2010.

From Attachment 1:

The Wheaton site is approximately 2.7 acres. The existing Wheaton site building was reportedly constructed in 1960. The building originally utilized two on-site septic systems for wastewater disposal, both of which were installed in 1960. The eastern septic system was located alongside the eastern wall of the building and consisted of three 1,000-gallon septic tanks, two leach field areas, and at least one seepage pit outside the southeastern corner of the building. On the southern side of the building was a smaller system, consisting of a 500-gallon septic tank and associated leach field. In 1990, the eastern septic system was removed; the southern system was converted to a mounded leach field in 1991 and, at the time of the 1994 memo, remained in service. During a March 2010 visit to the area, TRC observed the mound and some piping at this location. According to the 1994 memo, Wheaton officials indicated that the eastern system received sanitary wastes until 1984, at which time the eastern lavatories in the building were removed. The seepage pit at the southeast corner was reportedly piped from an unknown source.

The southern septic system received sanitary waste from lavatories along the southern wall of the building, as well as non-hazardous detergent wash water during Galena's occupancy.

NJDEP database information indicates Galena Lead Crystal (Wheaton Industries) was issued NJPDES Permit No. NJ0064416 from October 1987 through October 1992 as part of the Site Remediation Program.

A company called Atlantic Thermoplastics reportedly occupied the facility in the 1960s; however the exact operations and chemicals used on site at that time are not identified in the files.

The facility was first leased to a Wheaton Industries subsidiary (Decora, Inc.) in 1977. Wheaton purchased the site in 1980. Initial on-site operations included the decoration of plastic bottles by hot-stamping and screening. Solvents used during this process from 1977 to 1980 included methyl ethyl ketone (MEK), toluene, and TCA. From 1980 through 1982, the plastic decorating process was discontinued in favor of a glass bottle operation that utilized toluene. The facility was reportedly inactive from 1982 until 1984.

Galena Lead Crystal operated a cleaning and packaging facility for lead crystal lamps from 1984-1986. Reportedly, only over-the-counter non-hazardous cleaning products, such as Windex and dish detergents, were used.

The following VOCs were first detected in a 60-foot deep on-site potable well in 1984: TCE, 1,1-dichloroethylene (1,1-DCE), and TCA. The well was located within the Wheaton building (at the northwest building corner). Potable use of the well was discontinued in 1984 and process usage (reportedly closed-loop, non-contact coolant) ended in 1986. NJDEP investigated the septic system and found VOCs. A NJPDES permit was issued for post-closure monitoring in 1987.

In 1989 a soil gas survey identified the following detectable VOCs: DCE (unspecified speciation), TCE, PCE, and toluene, with the highest concentrations found at the northeast building corner (3,200 ppb – total volatiles), at the southeast property corner (3,100 ppb – total volatiles), and the western side of the building (873 ppb – total volatiles). A subsequent investigation found detectable VOCs at 0.5 feet above the water table (TCE at 15 ppb; toluene at 8 ppb; and methylene chloride at 6 ppb). Galena then removed the eastern septic tanks and seepage pit. Sludge samples from three of four septic tanks contained high concentrations of VOCs (toluene ethylbenzene and xylenes), with remaining compounds comprised of halogenated VOCs, including PCE (2,500 ppb), TCE (14,000 ppb), TCA (12,000 ppb) and 1,2-DCE (120,000 ppb).

From Attachment 2:

This 2002 memo from Wheaton personnel indicates that “scorching” high concentrations of TCE and DCE (unspecified speciation) in groundwater monitoring wells at the Wheaton/Galena facility (7,000 and 10,500 ppb, respectively) could potentially be “dismissed” as a “slug” coming from the SMC site.

TRC notes that SMC wells have VOC concentrations in the 100s of ppb, not thousands of ppb, as at the Wheaton site.

From Attachment 3:

This 2003 NJDEP email indicates that **“DEP has re-evaluated the former Wheaton site and determined that discharges occurred there during the tenure of Wheaton.”** NJDEP is notifying Alcan that Alcan is responsible for performing additional remedial efforts, and that an Expanded Site Investigation (ESI) must be completed. [TRC has requested a copy of this document, which was not in the file at the time of our review. As of the date of this memo, the NJDEP has not found the document]

From Attachment 4:

In 2005, the NJDEP identified the Wheaton site as a potentially responsible party (PRP) according to a Site Investigation (SI) prepared by BEMSA. The SI further states that “...PCE and TCE discovered in groundwater at the site is not distinguishable to those contaminants found at the [eastern] adjacent Car Wash site.”. The memo further explains that an ESI, which involves the installation of wells and the completion of a bromide tracer test, is proposed for the Wheaton site.

From Attachment 5:

The August 2007 memorandum indicates that a bromide tracer test had thus far involved the collection of 400 groundwater samples from 40 monitoring wells, and was to-date inconclusive in determining groundwater flow direction. The memo states that:

“groundwater in the area is flowing in a generally southern direction. We have observed slight mounding conditions in the septic area. We are planning for more specific interpretations and calculations in order to determine groundwater flow in this area as accurately as possible.”

TRC notes that the 2 extraction wells at the car wash affect localized groundwater flow directions, and that the extensive monitoring done for the SMC site provides a good understanding of groundwater flow.

From Attachment 6:

The files include a NJDEP air permit for the Vineland location dated 1985, showing two chrome plating tanks. Typically, NJDEP air permits are valid for 5 years. The files did not include a permit dating back to 1980, but property records indicate that Wheaton Industries acquired the property in 1980. The air permit verifies that chrome plating operations were ongoing in 1985, but it is possible that operations extended back to 1980.

The 1985 air permit indicates that the facility utilized two **chromium plating** tanks, with mist scrubber to control air emissions. The file included a permit referencing the use of chromium trioxide (chromic acid) for chromium plating, and a mist scrubber for control of chromic acid.

The files indicate that the NJDEP air group inspected the facility in 1992 and 1996, specifically indicating that the chrome tanks were still in use. The files also indicate that Wheaton performed stack testing on the operating chrome plating system in 1998, identifying ongoing chromium emissions.

The file indicated that the NJDEP air group inspected the facility in 1999, indicating that the operation had been moved to Wheaton's Millville facility.

Therefore, the NJDEP documents that **chrome plating at this location occurred from 1985 to 1998**, and it is likely that it started in 1980, when Wheaton acquired the property.

From Attachment 7:

The trade publication entitled *Pollution Prevention Technology Profile - Trivalent Chromium Replacements for Hexavalent Chromium Plating*, published by the Northeast Waste Management Officials' Association (NEWMOA), indicates that the principal ingredient in hexavalent chromium plating solutions is chromium trioxide (chromic acid). Other information provided by the publication is as follows:

- Chromium trioxide contains approximately **52% hexavalent chromium**. Baths typically contain 28-32 ounces of hexavalent chromium per gallon. The hexavalent oxidation state is the most toxic form of chromium, which is heavily regulated by US EPA.
- Chromium air emissions are frequently controlled by wet scrubbers. The discharge of these systems is **treated with other process wastewaters**. Wastewater that contains hexavalent chromium is treated first by acidification, reduction, and then neutralization to precipitate the chromium as chromium hydroxide. Typical discharge concentrations for hexavalent and/or total chromium in wastewater are 0.1 to 1.0 ppm.
- **Spent chromium plating baths are handled as hazardous waste**. Precipitated chromium hydroxide sludges are regulated as F006 hazardous waste. For each pound of chromium that is lost to the waste treatment operations, 9.5 pounds of sludge (35% solids) are created.

TRC notes that this facility operated with the use of septic tanks and leach fields during the existence of the chromium plating line at this site.

From Attachment 8:

The title search included as Attachment 8 indicated the following.

The Wheaton Industries site occupies Parcel Block 501, Lot 34, Cumberland County, New Jersey. The site is currently owned by **Joseph DiMento Realty, LLC, who acquired the property in April 2001 from Wheaton USA, Inc.**, a Corporation of the State of New Jersey. Previous owners are:

- Wheaton USA (as Decora Industries, a Wheaton subsidiary) from September 1980 to April 2001;
- Delsea Realty from November 1977 to September 1980;
- Sidney and Lois Brody from December 1973 to November 1977;
- Henry and Lois McNeil from May 1969 to December 1973;
- William P. Riggan, Sheriff in 1969 (by seizure);
- Atlantic Thermoplastics Corporation from November 1965 to 1969;
- E. Roger and Helen Jones from July 1960 until November 1965; and
- The estate of James Sweetman from prior to 1940 until July 1960.

North Vineland Car Wash – 130 West Weymouth Road

The North Vineland Car Wash is located just east of the Wheaton site, and 400 feet west-southwest of the southwest property boundary of the SMC site, along the north side of West Weymouth Road. SMC/TRC operates 2 extraction wells at this location.

The following documents were referenced for the North Vineland Car Wash:

1. Attachment 1: July 21, 1994 NJDEP Memorandum to William Dunfee, Supervisor NJDEP SFO; Subject: Northwest Vineland Groundwater Contamination Case
2. Attachment 9: Internal NJDEP email dated March 5, 2002 from Marc Bonfiglio to M. Simpson
3. Attachment 10: Internal NJDEP email dated March 7, 2002 from Edward Post to J. Hamilton, et al.
4. Attachment 11: August 11, 2003 letter to GHR Consulting Services from Nick Sodano, NJDEP
5. Attachment 12: NCO Financial Systems, Inc., Property Report, North Vineland Car Wash, 130 W. Weymouth Rd., Vineland, NJ 08360, April 8, 2010.

Other Reference:

- Telecon, March 3, 2010 between Joe Vetrano, TRC and Frank Sorce, NJDEP Section Chief, Site Assessment Section, Bureau of Environmental Management, Site Assessments.

From Attachment 1:

In 1993, the NJDEP SFO and the New Jersey Bureau of Groundwater Pollution Abatement (BGWPA) concluded that the North Vineland Car Wash was not likely a source of chlorinated solvents, despite not knowing the full nature of discharges into the on-site septic system.

From Attachment 9:

A March 5, 2002 inspection of the facility by the NJDEP indicates that the car wash facility is an unmanned car wash. No degreasers were observed on-site. It is noted that the soap storage room was not accessible, but not a likely source of PCE-containing materials. The washing bays reportedly drain into a large septic field located on the north side of the property. The narrative indicates that while the car wash is an unsecured site, which would not prevent “someone from dumping solvents down the drain of the wash bays, it is unlikely that the car wash itself is the culprit here.”

From Attachment 10:

This March 7, 2002 memo indicates that a notice of violation was to be issued to the owner for an (unspecified) unpermitted discharge into septic system. The violation states only that the facility was discharging pollutants to the waters of the State without a valid NJPDES permit issued by the NJDEP.

From Attachment 11:

This August 11, 2003 letter seeks to engage a consultant to conduct field sampling services at the North Vineland Car Wash to investigate its potential as a responsible party (RP) for the Northwest Vineland Groundwater Contamination Case. The engagement letter indicates that the car wash has not been thoroughly investigated to date.

Subsequent investigations at the car wash are similar to Attachments 5 and 6 cited for the Wheaton facility.

On March 3, 2010, TRC spoke to Mr. Frank Sorce, NJDEP Section Chief, Site Assessment Section, Bureau of Environmental Management, Site Assessments. Mr. Sorce indicated that groundwater conditions in the Wheaton/Galena and North Vineland Car Wash area are still unresolved. A document summarizing all of the on-going issues at the North Vineland Groundwater Contamination Case has not yet been compiled. Mr. Sorce also indicated that the former case manager, Nick Sodano, is no longer with NJDEP and the *car wash case has not yet been reassigned*.

From Attachment 12:

The following ownership information for the North Vineland Car Wash site was provided by the Property Report as included as Attachment 12:

The North Vineland Car Wash site occupies Parcel Block 501, Lot 33, Cumberland County, New Jersey. The site is currently owned by David Guidarini, who acquired the property in August 2001 from Andrea DiOrio. Previous owners included Andrea DiOrio from July 1996 to August 2001; the estate of August Joseph Fiocchi from June 1987 to July 1996; Michael M. Rossi III from April 1985 to June 1987; Michael and Sandra Jones from December 1979 to April 1985; E. Roger and Helen Jones from July 1960 until December 1979; and the estate of James Sweetman from prior to 1940 until July 1960.

Fischer & Porter Company, Electronics Division / Andrews Glass Company, 3740 Northwest Boulevard

The Fischer & Porter property is located due west of the SMC site, across North West Boulevard.

The following documents were referenced for the Fischer & Porter / Andrews Glass site:

1. Attachment 1: July 21, 1994 NJDEP Memorandum to William Dunfee, Supervisor NJDEP SFO; Subject: Northwest Vineland Groundwater Contamination Case
2. Attachment 13: May 2006, Final Groundwater Report, Andrews Glass Company Facility, ISRA Case No. E94164, by Sigma Environmental Services, Inc.
3. Attachment 14: NJDEP Environmental Concerns Tracking Sheet, Fischer & Porter Co., Electronics Division, ISRA Case No. E94164, Conclusions dated September 9, 2008.
4. Attachment 15: December 23, 2008, No Further Action Letter and Covenant No to Sue, NJDEP to ABB, Inc.
5. Attachment 16: NCO Financial Systems, Inc., Property Report, Fischer & Porter, 3740 North West Boulevard, Vineland, NJ 08360, April 8, 2010.

From Attachment 1:

The Fischer & Porter site encompasses 6.5 acres and is developed with a 20,000-square-foot building that was constructed in 1961. Andrews Glass (a subsidiary of Fischer & Porter Co.) leased the property starting in 1956. Andrews Glass purchased the Fischer & Porter site in 1971. In 1988, the glass operation moved to 410 South Fourth Street, Vineland, NJ. The Fischer & Porter Electronics Division has continued to assemble printed circuit boards on-site.

From 1961 to 1986, circuit board assembly operations produced two waste streams. Raw circuit boards were washed prior to assembly, and the water was discharged into the “southwest” seepage pit, which also received effluent from an on-site spray booth. A solvent vapor cleaning unit was utilized to remove soldering flux from the circuit boards. The solvent used in the unit was reportedly “Freon-TMS” manufactured by DuPont. The solvent reportedly contained 94% trichlorotrifluoroethane, 5.75% methanol, and 0.25% nitromethane. Non-contact cooling water was discharged to a “north” seepage pit by a floor drain. Fischer & Porter reportedly discontinued all wastewater discharges in the early 1990s.

The Fisher & Porter facility reportedly had four separate on-site wastewater disposal systems. An eastern wastewater disposal system, located in front of the building along North West Boulevard, was comprised of two septic tanks each with its own cesspool, which reportedly

received “only” sanitary waste, and had a capacity of 500 gallons per septic tank per day. The western septic system, on the opposite side of the building, was comprised of a septic tank and three cesspools (block pit with gravel bottom construction), with a capacity of 500 gallons per day. A northern wastewater disposal system was located beneath the parking area on the northern side of the property and consisted of two septic tanks [capacity not provided], an eastern seepage pit, and a distribution box with two cesspools (block pit with gravel bottom construction) to the north. The northern wastewater disposal system was documented as receiving wastewater discharges from the glassware acid-etching rinse, glassware sand grinding operation, glassware washing, circuit board rinse water and the non-contact cooling water. A southern wastewater disposal system that consisted of a single septic tank [capacity not provided] was located outside the southwest corner of the building and was documented as receiving discharges from the deionized water rinse operation, as well as effluent from the circuit board spray booth.

The Andrews Glass operation at the site consisted of the manufacture of laboratory glassware. The process involved glass-blowing, hydrofluoric acid etching, sand buffing, and final washing. Prior to 1986, NJDEP reported that Andrews Glass discharged various cleaning process waste streams into the on-site seepage pits. Water utilized in the sand grinding operation was discharged to the northern septic system. Acid-etched glass, which was washed with a dishwasher soap and tap water, was also discharged into the northern septic system. **This glassware was then placed in a vapor cleaning/degreasing unit containing PCE.** The rinseate from this process was discharged specifically into the seepage pits at the north end of the main building, and non-contact cooling water was used in the vapor cleaning/degreasing unit for vapor suppression. This non-contact cooling water was then discharged into the northern septic system via a floor drain. In 1986, Andrews began drumming wash and rinse water, disposing it every other day via removal by the county utility authority. Spent solvents were reportedly collected for off-site disposal. Although moving the glassware operation off-site in 1988, Andrews continued the process of discharging non-contact cooling water utilized in the aforementioned circuit board vapor cleaning/degreaser units into the northern seepage pits.

A 1986 investigation by *NJDEP found PCE, 1,2 DCE and TCE* in the eastern and western septic systems, a southwestern seepage pit, two northern septic systems, and four northern seepage pits. Fischer & Porter was issued an NJPDES permit in 1987. Groundwater monitoring wells were installed in these areas in 1988. ***The groundwater monitoring wells in the northern seepage pit area exhibited the highest concentration of PCE (2,200 ppb).*** In 1991, sludge samples from the northern seepage pits revealed concentrations of PCE as high as 730 ppb and concentrations of TCE as high as 160 ppb.

In the early 1990s, Fischer & Porter reportedly removed many of the on-site septic systems and seepage pits. No documentation regarding post-closure sampling is available. It is unclear if any of the historic wastewater disposal systems remain.

In an April 27, 1993 Memorandum from Randolph Ciurlino, SFO, NJDEP, Division of Responsible Party Site Remediation, the following statement was made:

“...***Fischer & Porter facility has contributed PCE*** to the North West Vineland groundwater VOC contamination and **does appear to be a source from which this**

COC was discharged, contaminating the groundwater at the facility and subsequently contaminating down gradient potable wells.”

From Attachment 13:

The Fischer & Porter site was sold to the current owner, C & C Investments, a NJ partnership, in 1996, triggering an ISRA investigative/remediation need.

In March 1993, the inactive northern and southwestern industrial wastewater septic systems were removed under NJDEP oversight. Discharge systems and sludges were excavated and removed from the site. Post-excavation samples and additional excavation was completed during the period from 1993 through mid-1995. According to Sigma Environmental Services (Sigma), NJDEP approved no further action regarding site soils in May 1995 and March 1996.

PCE was detected during groundwater sampling events including concentrations of 84 ppb in October 1988 (MW-2 on the Fischer & Porter site, which was located on the northern side of the property, approximately 300 feet west, cross gradient of the SMC site) and at a concentration of 92 ppb at MW-7 in 1995 (located on the southern boundary of the Fischer & Porter site, just north of the North Vineland Car Wash). In December 2005, Sigma reported concentrations in MW-7 of 46.1 ppb and 50.6 ppb (duplicate).

TRC notes that NJDEP has promulgated more stringent cleanup standards in 2009.

From Attachment 14:

In October 2008, the NJDEP provided a no further action/covenant not to sue (NFA/CNS) for the Fischer & Porter site, citing the following rationale:

- December 2005 round of GW sampling did not detect PCE above the groundwater quality standards (GWQS) in on-site wells MW-2, MW-3, and MW-6. These wells are located on the northern, western, and southwestern sides of the Fischer & Porter site, respectively.
- Downgradient detections of PCE in wells MW-5 and MW-7 appeared to be unrelated to the Fischer & Porter site and were instead *attributed to the former Wheaton facility* and North Vineland Car Wash sites. Discharge features at both sites (subsurface storm water collection units at Wheaton and the septic system at the car wash) could potentially cause groundwater mounding, which, in theory, could extend (contamination) to Fischer & Porter wells MW-5 and MW-7.
- ***The Fischer & Porter site had a documented source of PCE*** and discharge mechanism (industrial wastewater system) to introduce PCE contamination to the subsurface. Discharge of the vapor degreaser into the system began in 1961 and decreased in volume after 1970 due to increased use of decals to mark glassware. The bulk of PCE discharge likely occurred between 1961 and 1972.
- All facility discharges ceased in 1986, except non-contact cooling water which continually discharged into the wastewater system for two years, until 1988. NJDEP concurred with Fischer & Porter / Andrews Glass / ABB representatives that this activity

effectively flushed the industrial wastewater system and associated leach field of contaminants before groundwater sampling associated with the Fischer & Porter NJPDES permit was issued in February 1988. [**Note: TRC finds no evidence that chlorinated solvents, recalcitrant contaminants, were effectively flushed from the Fischer & Porter site**]

- In 1986, PCE was detected in down gradient residential wells and (partially) attributed to the Andrews Glass facility.
- NJDEP concluded that there is a lack of on-site source concentration data from the time of heaviest discharge to accurately assess contaminant fate and transport. Additionally, almost 35 years have passed since the time of heaviest discharge. Numerous hydraulic influences in the north Vineland area (i.e. intermittent pumping of known and unknown irrigation wells, pumping of municipal production wells, historic and current use of residential wells, gaining and local streams and lakes) and it would be nearly impossible to predict the current location and concentration of the impact. It would also be very difficult to differentiate between historic contaminant sources (i.e. Fischer & Porter) and other more local or contemporary point source contributions.
- NJDEP's final conclusion for the NFA/CNS is as follows: "... *characterization of off-site impact attributable to the historic discharge at the Fischer & Porter site is considered technically impractical and a poor use of available [NJDEP] resources.*"

From Attachment 15:

The Fischer & Porter / Andrews Glass site, under ownership by ABB, Inc., was issued a No Further Action Letter by NJDEP on December 23, 2008.

From Attachment 16:

The following ownership information for the Fischer & Porter site was provided by the Property Report:

The Fischer & Porter site occupies Parcel Block 501, Lot 29, Cumberland County, New Jersey. The site is currently owned by C & C Investments, a New Jersey Partnership, who acquired the property in September 1996 from the Fischer & Porter Company, a Corporation of the State of Pennsylvania. Previous owners include the Fischer & Porter Company from April 1985 to September 1996; Andrews Glass Company from February 1971 to April 1985; E. Roger and Helen Jones from July 1960 until February 1971; and the estate of James Sweetman from prior to 1940 until July 1960.

Research Glass of New Jersey – 3770 North West Boulevard

The Research Glass site is located due north of the Fischer & Porter / Andrews Glass site, and is due west (cross gradient), across North West Boulevard from SMC.

The following documents discuss the Research Glass issues:

1. Attachment 1: July 21, 1994 NJDEP Memorandum to William Dunfee, Supervisor NJDEP Southern Field Office; Subject: Northwest Vineland Groundwater Contamination Case
2. Attachment 13: May 2006, Final Groundwater Report, Andrews Glass Company Facility, ISRA Case No. E94164, by Sigma Environmental Services, Inc.

From Attachment 1:

The 1994 NJDEP memo indicates that Research Glass operated a hand-tooled glass facility, manufacturing custom glassware from stock glass tubing. Reportedly, no etching was performed on-site and chemical processes were not used in tooling/cleaning of finished products. Glass was reportedly washed in a non-phosphate detergent, and all rinseate was reportedly discharged to an on-site septic system. As part of the North Vineland Groundwater Contamination case, the New Jersey Department of Water Resources (DWR) collected samples from the septic bed in April 1986 and found elevated levels of (unspecified) VOCs. As a result, an NJPDES Permit was issued in November 1987, which required the installation of monitoring wells. Quarterly results indicated a possible leaking underground storage tank (UST). According to NJDEP, an on-site gasoline UST was removed in 1990. The NJDEP SFO and BGWPA concluded that Research Glass was not a likely source of the North Vineland Groundwater Contamination, based upon the nature of site data revealing the leaking UST, along with groundwater contouring.

According to the latest leaking underground storage tank (LUST) database information (EDR-March 2007) the leaking tank case was closed in 2001.

From Attachment 13:

Sigma reported PCE data from two groundwater monitoring wells (MW-1 and MW-2) installed at Research Glass in 1989 and 1991, respectively. These wells are/were located on the Research Glass property approximately 150 to 250 feet west of the SMC site. Sigma produced sampling data from 1989 through 1997 for MW-1 that revealed a maximum concentration of **177.49 ppb PCE** detected in January 1992. The remainder of sampling events revealed concentrations of PCE between 1 and 100 ppb for this period. Limited data were available for MW-2 – only from January 1991 (1 ppb) and June 1992 (5 ppb).

[TRC notes that Research Glass was issued NJPDES Permit No. NJ0063541 (renewal) from January 1998 through January 2003 for an industrial Underground Injection Control (UIC) system discharge to groundwater.]

Marshall Services – 17 Pearl Street, Newfield, NJ

The Marshall Services site is located approximately 550 feet north of SMC (upgradient). The following documents were referenced for the Marshall Services site:

1. Attachment 1: July 21, 1994 NJDEP Memorandum to William Dunfee, Supervisor NJDEP SFO; Subject: Northwest Vineland Groundwater Contamination Case

2. Attachment 13: May 2006, Final Groundwater Report, Andrews Glass Company Facility, ISRA Case No. E94164, by Sigma Environmental Services, Inc.

From Attachment 1:

- Marshall Services is a tank truck operation that hauls petroleum products.
- The Marshall Services facility was cited by NJDEP for violations of the Water Pollution Control Act and the Spill Compensation and Control Act, which have reportedly been resolved.
- Contaminants of concern were reportedly non-chlorinated hydrocarbons.
- A NJDEP DWR sampling event in 1986 did not reveal the presence of North Vineland Groundwater Contamination contaminants of concern (COCs).

From Attachment 13:

- The Marshall Services facility has reportedly been in operation since 1933.
- Waste disposal documentation filed with NJDEP reported **waste PCE**.
- A groundwater sample collected from a private supply well at 19 Catawba Avenue had a concentration of 2.6 ppb PCE in May 1986 during sampling by NJDEP. This location is approximately 1 block north of Marshall Services and approximately 900 feet north of SMC.

[TRC notes that Marshall Services, Inc. was issued NJPDES Permit No. NJ0036129 (renewal) from September 1998 through January 2002 for basic storm water runoff.]

Gelsi Mustang World / Gelsi Auto Repair – 3576 North West Boulevard

The Gelsi site is located on the west side of North West Boulevard, approximately 600 feet southwest of the southwest property boundary of SMC and the intersection of North West Boulevard and West Weymouth Road.

The following documents were referenced for the Gelsi Mustang site:

1. Attachment 1: July 21, 1994 NJDEP Memorandum to William Dunfee, Supervisor NJDEP SFO; Subject: Northwest Vineland Groundwater Contamination Case
2. Attachment 13: May 2006, Final Groundwater Report, Andrews Glass Company Facility, ISRA Case No. E94164, by Sigma Environmental Services, Inc.

From Attachment 1:

- The NJDEP DWR conducted groundwater sampling in June 1986 that did not indicate the presence of North Vineland Groundwater Contamination COCs. The DWR and Bureau of Groundwater Quality Management eliminated Gelsi as a PRP in August 1988.

From Attachment 13:

- Sigma (2006) reported known solvent waste during a review of Gelsi files at NJDEP.

It should be noted that numerous junk cars are currently present on exposed soil at this property, which lies adjacent to the Hudson Branch.

Dauito's Express / Budget Truck Repair – 3526 North West Boulevard

The Dauito's site is located on the west side of North West Boulevard, approximately 900 feet southwest of the southwest property boundary of SMC and the intersection of North West Boulevard and West Weymouth Road.

The following documents were referenced for the Dauito's Express site:

1. Attachment 1: July 21, 1994 NJDEP Memorandum to William Dunfee, Supervisor NJDEP Southern Field Office; Subject: Northwest Vineland Groundwater Contamination Case

From Attachment 1:

- The NJDEP DWR conducted groundwater and soil sampling at this site in May 1986. Soil sample analysis results did not reveal the presence of North Vineland Groundwater Contamination COCs. Elevated levels of TCE were detected, however, in an on-site potable well (concentration not provided). The DWR and Bureau of Groundwater Quality Management eliminated Dauito's Express as a PRP in August 1988.
- In 1989, poor housekeeping was discovered by NJDEP personnel. Unspecified remediation of on-site contamination was completed in February 1992.

It should be noted that, similar to Gelsi Mustang, numerous junk trucks are present on exposed soil at this property.

Former UPS – 3690 North West Boulevard

The former UPS site is located on the west side of North West Boulevard, west of SMC and just south of the Fischer & Porter site.

The following documents were referenced for the former UPS site:

1. Attachment 1: July 21, 1994 NJDEP Memorandum to William Dunfee, Supervisor NJDEP SFO; Subject: Northwest Vineland Groundwater Contamination Case
2. Attachment 13: May 2006, Final Groundwater Report, Andrews Glass Company Facility, ISRA Case No. E94164, by Sigma Environmental Services, Inc.

From Attachment 1:

The 1994 NJDEP memo reports that the two-acre site is developed with a 7,400-square-foot building that was constructed in 1965. The document also indicates that SMC purchased the facility in 1971. NJDEP noted that unsubstantiated allegations had been made to suggest that solvents were stored on the UPS site and used for routine cleaning of delivery trucks. The

NJDEP SFO and BGWPA staff inspected the grounds on an unspecified date and did not note any indication of current or former USTs. The SFO and BGWPA concluded that the former UPS site did not appear to be a source of the COCs of the North Vineland Groundwater Contamination case.

From Attachment 13:

The Sigma report notes that NJDEP files indicate that the former UPS site utilized on-site USTs for solvent storage. Additionally, a December 1988 report by Dan Raviv Associates, Inc., indicated that a 1,000-gallon septic tank and associated leach field were installed in spring 1988 on the east side of the building. The 1988 septic system replaced an earlier system located on the north side of the property, which also consisted of a 1,000-gallon septic tank and two seepage pits. In August 1986, an 8,000- to 10,000-gallon UST was removed from the north yard of the facility. A 300-gallon waste oil tank was removed in August 1987 in the area of the newer septic system installed in 1988. The Sigma report also indicates that four pits used for the collection of truck washing liquids were present outside the building, two on the north side, and two on the south side.

Former Jamar Laundry – 3600 North West Boulevard

The former Jamar Laundry site is located at North West Boulevard and Weymouth Road, on the southwestern side of the intersection, approximately 300 feet southwest of the southwest property boundary of SMC, and just north of Gelsi Auto Repair.

The following documents were referenced for the former Jamar Laundry site:

1. Attachment 17: NJDEP Work Plan for Site Investigation, Jamar Laundry, N. West Blvd & Weymouth Road, undated, but post August 2003, based on the revision date on the form.

From Attachment 17:

The facility is currently occupied by Jamar Groceries. Anecdotal information from the Vineland Fire Department revealed that the facility was formerly known as Jamar Laundry, a coin-operated facility that may also have offered dry cleaning services. The referenced “workplan” noted above was simply a review of aerial photographs and information to date on the facility.

Industrial Diesel – 256 Weymouth Road

The former Industrial Diesel site appears to have been located on the north side of Weymouth Road, just east of North West Boulevard and approximately 100 feet south of the southwest property boundary of SMC.

The following documents were referenced for the former Industrial Diesel site:

1. Attachment 1: July 21, 1994 NJDEP Memorandum to William Dunfee, Supervisor NJDEP SFO; Subject: Northwest Vineland Groundwater Contamination Case

TRC notes that the facility is apparently now developed as a church.

From Attachment 1:

NJDEP reported that Industrial Diesel was a heavy truck repair shop. The NJDEP DWR collected site soil samples in May 1986, which revealed surface impacts from petroleum hydrocarbons and (unspecified) metals, but no North Vineland Groundwater Contamination COCs. Monitoring wells were installed in 1988 and the DWR and the Bureau of Groundwater Quality Management (BGWQM) concluded that Industrial Diesel was not a PRP in the North Vineland Groundwater Contamination case.

Newfield Landfill – Newfield Borough, New Jersey

The Newfield Landfill is an inactive landfill site (CERCLIS ID No. NJD980505556) located on Gorgo Lane, between Catawba Avenue and Weymouth Road in Newfield Borough, New Jersey. The landfill is approximately 29 acres in size and abuts the northeastern boundary of the SMC site.

The following documents were referenced for the Newfield Landfill site:

1. Attachment 18: June 13, 1997 Final Site Inspection Prioritization Report, Newfield Landfill, Newfield Borough, Gloucester County, New Jersey; Prepared by Region II Superfund Technical Assessment and Response Team for the United States Environmental Protection Agency.

From Attachment 18:

The reference document reports the following information on this site:

- The Borough of Newfield purchased 19 acres from a private landowner in 1972, for use as a landfill. No liner and no leachate collection system were used. The previous use of the site was as a gravel pit. Sometime between 1972 and 1978, the Borough of Newfield leased an additional 10 acres to extend the landfill boundary. In 1979 the landfill was “closed” in an unspecified manner, but still received leaves and wood from the borough.
- Wastes deposited at the borough included household and municipal waste, bulk waste such as concrete and wood, waste glass, and vegetative waste (leaves and brush).
- In 1976, several hundred bushels of a white powdered substance was disposed at the site and subsequently removed (date of removal is unknown). Analysis of the material revealed predominantly a mixture of salts in the following percentages: sulfate, 18%; magnesium, 0.74%; chloride, 15.2%; potassium, 14%; sodium, 20%, lead, 0.025%, aluminum, 0.005%, silicon, 0.013% and boron, 1%. Between 1972 and 1978, the landfill accepted a large quantity waste glass from Owens-Illinois, Inc.

- In the 1980s, the borough received violations from the Gloucester County Health Department and NJDEP for continuing to deposit material (leaves and wood) at the landfill after it was “closed”. Violations for improper cover of refuse and inadequately protecting the site from illegal dumping were also received.
- A USEPA inspection in 1979 revealed evidence of burned wood pallets on the site. During inspections in the early 1980s EPA noted leachate ponds, exposed refuse, and improper grading on site.
- In 1984, the borough was issued an interim NJPDES permit No. NJ00554399 to install monitoring wells and to conduct quarterly monitoring of groundwater. The borough was issued violations by NJDEP in the 1980s for failing to conduct testing within the required timeframes, and for discontinuing groundwater monitoring in 1988. The borough received relief from groundwater monitoring in 1989, on the basis that no groundwater contaminants had been attributed to the landfill.
- The only groundwater contaminant determined to be above permit limits and attributable to the landfill was iron. Data compiled by NUS Corporation showed that, in January 1986, iron was detected in two wells along the southwestern side of the site at levels more than three times background (48,200 ppb and 42,400 ppb). The levels of iron were noted to be consistent with those commonly found in municipal landfills.
- The US EPA Region II Field Investigation Team performed a Site Inspection of the landfill in March 1989. Four groundwater samples and four soil samples were collected. Groundwater in the area of the landfill was determined to flow in a southwesterly direction.
- Analyses of the groundwater indicated that no releases of contaminants attributed to the site had occurred. Contaminants detected in the northeasternmost (background) well included cadmium (21 micrograms per liter [ug/L]), iron (22,683 ug/L), lead (104 ug/L), manganese (79 ug/L), and zinc (136 ug/L). Calcium was detected at more than three times background in one of the wells (10,800 ug/L). Sodium was detected at more than three times background in another well (7,480 ug/L).
- Soil sample analysis revealed the presence of several polycyclic aromatic hydrocarbon (PAH) compounds on the western portion of the landfill, including fluoranthene (1,300 micrograms per kilogram [ug/kg]), pyrene (1,200 ug/kg), chrysene (990 ug/kg), benzo(b)fluoranthene (1,200 ug/kg), and benzo(a)pyrene (900 ug/kg).
- Based upon a review of background information, data generated during the NUS Site Investigation, and data and target information applicable to evaluating the landfill site under the Hazard Ranking System (HRS), it was determined that further sampling was not necessary to characterize the site.

Bondy Oil, Inc. – Northeast Boulevard, Newfield, NJ

Bondy Oil is located along Northeast Boulevard, just north of the SMC site. According to NJDEP database information provided by EDR, a 40-year old, 550-gallon gasoline UST was found to have leaked during tank removal in 1990. The site was confirmed to have impacted soil and groundwater. A No Further Action Status was granted by NJDEP in August 1995. TRC noted UST registration and closure documentation in the site file; however, no remedial investigation reports or cleanup reports were observed in the NJDEP file review on February 18, 2010.

CONCLUSIONS

The review of environmental files for identified properties in the area of SMC has identified a number of sites with known or suspected sources of chromium and chlorinated solvents to area groundwater.

The data suggests that the Wheaton site may have been a source of hexavalent chromium contamination in the groundwater for the following reasons:

- A chrome plating process was employed at the Wheaton site from 1985 (likely as early as 1980) to 1999;
- Trade documents cite that this type of chrome plating operation produced wastes and wastewater containing hexavalent chromium;
- The facility utilized only septic systems (no public sewer is available, nor ever was);
- No NJDPES permit was found in the files; and
- The chlorinated solvent investigation proved that the septic systems effectively transported discharged waste contaminants into area groundwater.

With respect to sources of chlorinated VOC contamination in the groundwater, the following sites are **documented** sources of **TCE and PCE** to area groundwater:

1. Wheaton Industries / Galena Lead Crystal
 - In 1989, sludge samples from three of four septic tanks contained high concentrations of VOCs (toluene ethylbenzene and xylenes), with remaining compounds comprised of halogenated VOCs, including PCE (2,500 ppb) and TCE (14,000 ppb), among others.
2. Fischer & Porter / Andrews Glass
 - In 1988, groundwater monitoring wells in a northern septic seepage pit area exhibited the highest concentration of PCE (2,200 ppb).
 - In 1991, sludge samples from the northern seepage pits revealed concentrations of PCE as high as 730 ppb and concentrations of TCE as high as 160 ppb.
3. Research Glass
 - In 1992, a maximum concentration of PCE (177 ppb) was detected in an on-site monitoring well.
 - In 1986, elevated levels of unspecified VOCs in septic system bed.

The following sites are **suspected** sources of chlorinated solvents to area groundwater:

1. Marshall Services
2. Dauito's Express / Budget Truck Repair

The following sites are possible sources of chlorinated solvents to area groundwater:

1. Gelsi Automotive/Gelsi Mustang
2. Former Jamar Laundry

3. Industrial Diesel
4. Former UPS facility (formerly owned by SMC)
5. North Vineland Car Wash

ATTACHMENT 1

NJDEP MEMORANDUM, JULY 21, 1994



**State of New Jersey
Department of Environmental Protection and Energy**

Division of Responsible Party Site Remediation
Central Field Office
CN 407

Robert C. Shinn, Jr.
Commissioner

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Wm
7-22-94

To: William Dunfee, Supervisor, Southern Field Office

From: Randy Ciurlino, HSMS IV and Cindy *GO* Davis, Prin. Env. Spec.

Subject: Northwest Vineland Ground Water Contamination Case

Date: July 21, 1994

INTRODUCTION:

In January 1986 volatile organic contamination was discovered in 27 residential wells and municipal supply well #10 in North Vineland, Cumberland County (Figure 1). Subsequently, the Spill Compensation Fund provided financing for water main construction, residential water hook-ups and a temporary air stripper on well #10. The Spill Fund is currently attempting to recover its costs from the party or parties responsible for the Northwest Vineland Ground Water Contamination (NWVGWC).

The NWVGWC was initially investigated by the Division of Water Resources (DWR) with geologic support from the Bureau of Ground Water Quality Management (BGWQM). Several potential responsible parties (PRPs) were identified in the course of this investigation i.e., Andrews Glass Company (AKA Fischer & Porter Company, Electronics Division), Galena Lead Crystal (Division of Wheaton Industries), Research Glass Company, Shieldalloy Metallurgical Corporation (AKA SMC), Gelsi Auto Repair (AKA Gelsi Mustang), Davito's Express, Marshall Services Incorporated, Industrial Diesel and North Vineland Car Wash. As a result of the investigation, Fischer & Porter Company, Galena Lead Crystal and Research Glass Company were issued New Jersey Pollution Discharge Elimination System (NJPDES) permits for the discharge monitoring of pollutants into their respective septic systems. These permits were formerly administered by the Bureau of Ground Water Discharge Prevention and are currently handled by this office.

In an effort to define the extent of the contamination, a total of 83 monitoring wells have been installed by Fischer & Porter, SMC, and Galena Lead Crystal. The issue which remains in dispute is which of the PRP's has contributed to the volatile organic compounds (VOC) portion of regional ground water contamination. The Southern Field Office (SFO) has been given the responsibility of evaluating the available information and identifying the responsible parties (RPs) in this area. This task was accomplished with technical support of Tim Maguire, Bureau of Ground Water Pollution Abatement (BGWPA).

The contaminants of concern (COC) in the area are the VOC's: trichloroethene (TCE), 1,2-dichloroethene (1,2-DCE), 1,1,1-trichloroethane (TCA) and tetrachloroethene (PCE). Additionally, a hexavalent chromium (Cr+6) plume has been identified as originating solely from the Shieldalloy facility. This

contamination has resulted in Shieldalloy Metallurgical Corporation being a National Priority List (NPL) site which is presently handled by the Bureau of Federal Case Management.

The water table aquifer in northwest Vineland is in the Cohansey Formation. The physical characteristics of the Cohansey aquifer render it highly susceptible to surface contamination since the shallow portion of the Cohansey Formation is 5 to 60 feet below the surface and the deep portion is 90 to 120 feet. The Cohansey aquifer is shallow, with the saturated zone beginning at 5 to 15 feet below grade. The Cohansey sands possess a high storage capacity and high hydraulic conductivity. Locally, this formation is predominantly composed of sand and is generally unconfined. In Northwest Vineland, the Kirkwood Formation underlies the Cohansey Formation. These two formations are shown to have a degree of interconnection, although the Kirkwood is predominantly a sand formation.

There are both shallow and deep wells in the NWVGWC area. The shallow wells are considered the homeowner wells, monitoring wells and recovery wells within 40 feet of grade. Based on the available information, the BGWPA calculated ground water velocity in the upper portion of this water table aquifer to be 2.4 feet per day or about 17,520 feet in 20 years. The deep wells are considered to be the other homeowner wells, monitoring wells, recovery wells and municipal supply wells which are beyond 70 feet below grade. Based on the available information, the BGWPA calculated ground water velocity in this lower portion of the water table aquifer to be 3.0 feet per day or about 21,900 feet in 20 years.

The ground water flow in northwest Vineland is generally from the northeast to the south-southwest, essentially parallel to the Hudson Branch of the Maurice River.

Galena Lead Crystal

Galena Lead Crystal, which is a division of Wheaton Industries is located at 158 Weymouth Road in northwest Vineland and encompasses 2.7 acres (Figure 2). The existing building was constructed in 1960, and has had five previous owners. A chronology of ownership is as follows: E. Roger and Helen Jones (1960-1965), Atlantic Thermoplastics (1965-1969), Henry and Lois McNeil (1969-1973), Sidney and Lois Brody (1973-1977), Delsea Realty Corporation (1977-1980) and Decora Division of Wheaton Industries, Inc. (1980-present). The on-site operations of the owners and operators prior to Wheaton Industries, Inc. (Wheaton) is unknown at this time. Wheaton has conducted various operations on-site since 1977, having leased the property prior to their purchase.

Wheaton's initial on-site operation was the decoration of plastic bottles utilizing therimage, hotstamp and screening. The three solvents in use on-site between 1977 and 1980 for cleaning prior to decoration or misprint removal were methyl-ethyl-ketone (MEK), toluene and 1,1,1-trichloroethane (TCA). These solvents were dispensed onto rags which were used to wipe the bottles. The plastic bottle operation ceased in 1980 and the use of MEK and TCA was discontinued. In 1980, a glass bottle decorating operation was conducted by Decora and toluene was still used in the previously mentioned manner. The facility was inactive between 1982 through 1984.

In 1984, Galena Lead Crystal began cleaning and packaging lead crystal lamps on-site. The cleaning operation used over-the-counter products, such as Windex and Dawn. Galena moved out of the facility in June of 1986. Subsequently, the

building has been rented as a book warehouse and to a plastics recycler (operation consisted of grinding and pelting only).

The Galena facility has two on-site septic systems i.e., the eastern and the southern septic systems (Figure 2), both of which were installed in about 1960. The eastern system is located side gradient to the on-site well and the southern septic is located down gradient of the on-site well. The eastern system consisted of two 1,000 gallon tanks and one distribution box, with the leach field emanating to the south. In 1978, an additional distribution box and leach field (emanating north) were added to the system. Wheaton has stated that this system received sanitary wastes till 1984, at which time the east lavatories were removed. The system was idle for six years and subsequently the tanks and distribution boxes were removed in 1990. In addition, a seepage pit is located at the extreme southern end of the above mentioned leach field, and is stated to be piped from an unknown source. The southern septic system is comprised of one 500 gallon tank and a leach field with two lateral lines emanating to the south. This system received sanitary waste from the south lavatories and wash water from the cleaning of glass light fixtures prior to packaging. The wash water consisted of common dish washing cleaners, such as Dawn, Joy, etc. The system was converted to a mounded leach field in 1991 and remains in service.

The Galena facility first detected VOCs (TCE, 1,2-DCE, TCA and 1,1-DCE) in their on-site potable well (located within the building at the northwest corner, depth - 60 feet) in 1984. Potable use of the well was discontinued in 1984, and its use of their closed loop non-contact cooling water was discontinued in 1986. Currently the site utilizes city water. An NJDEPE investigation (April 1986) disclosed that the facility had VOCs present in the septic systems and a NJPDES permit (No. NJ0064416) was issued for post-closure monitoring in August 1987.

Independent of the NJPDES investigation the two on-site USTs (one 500 gallon tank and one 550 gallon tank, both assumed to be #2 fuel oil) were removed in 1987. Post-excavation sampling (four per excavation) for total petroleum hydrocarbons (TPH) indicate no samples in excess of 157 parts per million (ppm).

In June 1989, pursuant to their NJPDES permit, Galena commenced a Phase I Investigation. A soil gas survey was conducted with 38 grid locations analyzed for 1,2 DCE, TCE, PCE and toluene (Figure 3). Thirty one samples locations (Figure 4) exhibited detectable VOCs, with the highest concentrations at the northeast building corner (grid point #8, 3200 ppb - total volatiles), the southeast property corner (grid point #14, 3100 ppb - total volatiles) and the west side of the building (grid point #20, 873 ppb total volatiles). The southeast location corresponded to the southern septic leach field.

The other two locations corresponded to two former lagoons (approximately 40 x 40 feet) that were observed in 1962 (Figure 5) and 1965 (Figure 6) aerial photographs (when Mr. and Mrs. Jones owned the property). These lagoons were backfilled some time between 1965 and 1974. In June of 1990, Galena began a Phase II Investigation. A soil boring program (Figure 7) was conducted based on the soil gas survey results. At 17 boring locations a total 22 samples were collected, seven from 1.5-2 ft. below grade and 15 from 0.5 ft. above the water table. All samples were analyzed for VOCs and priority pollutant metals. Three of the samples collected from 0.5 ft. above the water table contained detectable VOCs (B-7 TCE 15 ppb, B-4 toluene 8 ppb & TCE 13 ppb, B-16 methylene chloride 6 ppb).

At this time, the eastern septic tanks (3 tanks 1,000 gallons each) and seepage pit were removed (Figure 5). Sludge samples were taken from two of the three eastern septic tanks (one tank is stated to have not contained any sediment), and an additional sludge sample was taken from the southern septic tank. Three out of the four samples contained concentrations of VOCs. The total VOC concentration was 60% aromatics (i.e., toluene, ethylbenzene & xylenes) with the remainder comprised of halogenated VOCs including PCE (SP-5 2,500 ppb), TCE (SP-6 14,000 ppb), TCA (SP-5 12,000 ppb) and trans-1,2 DCE (SP-6 120,000 ppb).

Between 1987 and 1990 a total of eight monitoring wells were installed on-site (Figure 2). The depths of the monitoring wells are as follows: MW-1 20 feet, MW-2 18.5 feet, MW-3 24.5 feet, MW-4 25.65 feet, MW-5 23.83 feet, MW-6 14.0 feet, MW-7 14.0 feet and MW-8 14.0 feet. Monitoring wells MW-1 through MW-5 have been sampled 18 times (as of February 1993). The primary ground water contaminants (Figure 9) identified at the Galena facility are TCE and 1,2 DCE in the down gradient monitoring wells (MW-2 & MW-3, south end of the property) and PCE in the up gradient monitor well (MW-1). PCE is seen to be the primary VOC contaminant in MW-4 and MW-5. MW-3 the most down gradient well, consistently exhibits the highest total VOC concentrations. Monitoring wells MW-6, MW-7 and MW-8 were only sampled once (January 30, 1990) and showed high VOC's in that sampling event.

Based on a review of the available data SFO and BGWPA believe that the COC's of the NWVGWC do not appear to be sourced from the Wheaton Industries's Galena Lead Crystal facility and that the COC ground water contamination found at the facility does not appear to have been caused by discharges from the facility. These conclusions are based on the following information.

The Galena facility is down gradient from Shieldalloy Metallurgical Corporation (SMC), Fischer & Porter and several other PRPs. SMC has stated that between 1965 and 1967 their Manpro-Vibra degreasing unit utilized TCE and discharged its wash water into a drainage ditch. Fischer & Porter has stated that prior to September 1986, PCE was used on site and discharged to seepage pits. Additionally, the COCs identified in the ground water at the Galena facility have also been identified in the ground water at SMC and Fischer & Porter. Based on the known up gradient COC discharges, the timeframe of these discharges, the movement of these COCs through the aquifer (i.e., their absorption and/or retardation by colloidal particles), the calculated rate of ground water velocity (Figure 10) and the known direction of ground water flow (Figures 15 & 16), it is the conclusion of SFO and BGWPA that SMC and Fischer & Porter are the most likely source of the potable well contamination at the Galena facility. Contouring of the ground water data by BGWPA for the shallow aquifer (TCE - Figures 11 & 12, PCE - Figures 13 & 14, DCE - Figure 17) supports the aforementioned conclusion. Additionally, the former potable well is located side gradient to the eastern septic system and up gradient of the southern septic system. It is unlikely that the on-site septic systems were the source of the on-site potable well contamination.

The sludge sampling of the on-site septic systems indicated that they are contaminated with PCE (SP-5 2,500 ppb), TCE (SP-6 14,000 ppb), TCA (SP-5 12,000 ppb) and trans-1,2 DCE (SP-6 120,000 ppb). The available data does not indicate that these materials were utilized in any on-site process. The former on-site potable well has been documented as contaminated with the TCE, TCA, trans-1,2 DCE and to a lesser extent PCE. It is the conclusion of SFO and BGWPA that the septic bed contamination at the facility is most probably due to bacterial concentration of the COCs found in the septic organic matter and that the source of these COCs was most likely contaminated well water that was

→ DEP 7/7/2004 - Nick Sodano memo/circular
references this as a major error, also says
this memo was cut + posted by the authors from info submitted by Wheaton to DEP

discharged into the septic system. The contaminated on-site septic systems were removed in June 1990. If these systems had been a source of on-site ground water contamination, the down gradient monitoring well concentrations of the COCs would have been expected to decrease, and this has not been noted in the available data. It is the conclusion of SFO and BGWPA that the Galena on-site septic systems are not the source of the down gradient on-site monitoring well COC contamination nor did these septic systems contribute COCs to the NWVGWC.

Galena has stated that TCA was used on-site prior to 1980. This COC was detected in excess of the Ground Water Quality Standards, N.J.A.C. 7:9-6 (GWQS) in one sampling event (MW-3, sample date - January 30, 1990, TCA - 560 ppb [GWQS for TCA = 30 ppb]). Since this COC has not been previously or subsequently detected in any of the on-site monitoring wells at a level above the GWQS, it is the conclusion of SFO and BGWPA that it is unlikely that this contaminant is sourced from the Galena facility. Contouring of the available ground water data (1985-1986) by BGWPA for the shallow aquifer TCA plume (Figures 15 & 16) supports the aforementioned conclusion.

The Galena facility soil gas survey and soil boring program data did not indicate the high concentrations of the COCs that would be expected from contaminated soils (i.e. the former lagoons). Based on the available information SFO and BGWPA conclude that Wheaton's investigation of the soils at the Galena facility indicates that these soils are not a source of the COCs of the NWVGWC.

Fischer & Porter Company, Electronics Division - Andrews Glass Company

The Fischer & Porter facility is located at 3740 Northwest Blvd and encompasses 6.5 acres (Figure 18). The existing 20,000 sq. ft. building was constructed prior to 1956 by Edgar Rogers Jones (who operated the facility as a warehouse). Andrews Glass (a subsidiary of Fischer & Porter Company) leased the property in 1956 from Mr. Jones and purchased it from him in the early 1970's. Fischer & Porter's initial operation on-site was the manufacturing of laboratory glassware. In 1988 the glass operation moved to 410 South Fourth Street, in Vineland and the Fischer & Porter Electronics Division has continued to assemble printed circuit boards on-site (the starting date of this operation on-site is unclear).

The Fischer & Porter facility has four separate on-site waste water disposal systems (Figure 18). The eastern system (located in front of the building) is comprised of two septic tanks each with it's own cesspool (assumed to be a block pit, open gravel bottom construction), is stated to receive only sanitary septic (capacity 500 gallons per septic tank per day). The western system located to the rear of the building is comprised of a septic tank and three cesspools (each is a block pit with open gravel bottom construction), is stated to receive only sanitary septic (capacity 500 gallons per day). The northern system is located beneath the parking area at the north side of the building and consists of two septic tanks (M-1 and M-2), a seepage pit to the east (M-3, block pit and open gravel bottom construction) and distribution box with two cesspools to the north. This system has alternately been described as consisting of two septic tanks and four seepage pits. In previous NJDEPE DWR, BGWQM and NJPDES reports, M-1 and M-3 have been referred to as MO-1 and MO-2 respectively. The northern system has been documented as receiving waste water discharges from the glassware acid-etching rinse, glassware sand grinding operation, glassware washing, circuit board rinse water and the non-contact cooling water from vapor cleaning/degreaser unit. The southwestern system is located off the southwest corner at the rear building. The system consists of

a single septic tank, and has been documented as receiving discharges from the deionized water rinse operation, and effluent from the circuit board spray booth. Currently, there are no processes on-site that discharge to ground water at the facility but sanitary wastes are still discharged to the east and west septic systems.

The Fischer & Porter operation assembled laboratory and industrial glassware, and prior to 1986 the waste streams from the glassware process were discharged to the ground water on-site. The glassware was blown, hydrofluoric acid etched, sand ground and washed. Water was utilized in the sand grinding operation and subsequently discharged to seepage pits M-1 (northern septic system). After the acid-etching process the glass was washed with dishwasher soap and tap water (subsequently discharged to M-1, northern system) and the glassware was then placed in a vapor cleaning/degreasing unit containing PCE. The rinseate from the tap water wash operation was discharged to the northern septic system and non-contact cooling water was utilized in the vapor cleaning/degreaser unit for vapor suppression. This non-contact water was discharged to M-2 (northern septic) via an adjacent floor drain. Fischer & Porter began drumming their wash and rinse water in September of 1986 and it was disposed of every other day by the county utility authority, while the spent solvents were collected for off site disposal.

In 1988, the glassware operation moved off site and the non-contact cooling water from the vapor cleaning units continued to be discharged to the seepage pits M-2. The printed circuit board assembly operation generated several waste streams and the raw circuit boards were washed prior to assembly with this water being discharged to the southwestern seepage pit M-4. The printed circuit board production utilized a wet spray operation in which the boards are sprayed with polyurethane and xylene. The residues from this spray are combined with water in a tank and periodically drained to seepage pit M-4. The circuit board assembly process utilized a solvent vapor cleaning unit to remove soldering flux. The solvent utilized by this unit was DuPont "Freon-TMS" (percent by weight: trichlorotrifluoroethane - 94%, methanol - 5.75% and nitromethane 0.25%). Non-contact cooling water was discharged to M-1 and M-2 via a floor drain. These operations have subsequently been modified to eliminate all wastewater discharges. Currently, non-contact cooling water utilized in the circuit board vapor cleaning/degreaser unit is recycled in a closed loop system, and circuit board rinse water regenerated via ion exchange column.

The NJDEPE investigated the Fischer & Porter facility in 1986. Sediment samples were taken from all four of the on-site septic systems. The southwestern septic system (1,2 DCE 130 ppb, TCE 100 ppb) and the northern septic system (TCE 35 ppb, 1,2 DCE 10 ppb, PCE 120 ppb) were found to contain several of the COCs. The on-site potable well (located within the building, southwest corner, depth 50-75 feet) was sampled and found to contain 1,2 DCE 1.5 ppb, TCE 3.4 ppb and PCE 11 ppb. Fischer & Porter was issued NJPDES Permit No. NJ0063797, which became effective in September 1987. Subsequently, in January 1988, six monitoring wells were installed on-site (Figure 18) with the depths of the monitoring wells as follows: MW-1 25.0 feet, MW-2 23.7 feet, MW-3 24.4 feet, MW-4 19.6 feet, MW-5 20.3 feet and MW-6 24.5 feet. The first sampling round was conducted in February 1988 (Figure 19) (PCE was detected in MW-2 = 6 ppb, MW-3 = 28 ppb and seepage pit MO-2 = 2200 ppb). Pursuant to their NJPDES permit, Fischer & Porter has conducted quarterly sampling, and generally, MW-3, MW-4 and MW-2 have shown the highest VOC concentrations, with MW-2 and MW-3 showing the highest VOC concentrations in any single sampling event. PCE has been noted as above the GWQS (PCE = 2 ppb) in at least one

monitoring well (generally MW-2, MW-3 or MW-5) in almost every quarterly sample since the first quarter of 1988. Sampling of the seepage pit MO-2 indicated that PCE was detected in the first quarter of 1988 = 2200 ppb, the second quarter of 1988 16 ppb, and the third quarter of 1988 = 150 ppb. In February 1991, Fischer & Porter conducted a soil vapor survey of the northern septic area (Figure 20) and all the samples were analyzed for PCE, trans-1,2 DCE, and toluene. The sample results showed that PCE was detected in all samples (Figure 21) except P-25, P-26, and P-27. The highest concentrations of PCE were seen in P-1 13.27 ppm, P-2 9.02 ppm, P-3 2.95, and P-22 6.72 ppm. These sample locations correspond closely to the location of seepage pit MO-2. Trans-1,2 DCE was detected in five soil vapor samples and toluene was detected in one sample (the range of concentration for these two compounds was 0.08 ppm to 0.56 ppm. In July 1991, based on the results of the soil vapor survey, Fischer & Porter conducted a series of soil borings and resampled the north septic system (Figure 22). Soil samples were taken at three locations and each was sampled at two depths (4-5 feet and 10-11 feet). The soil samples were analyzed for a target list of compounds (including TCE, PCE, 1,2 DCE and toluene) and only traces of the COCs were detected (Figure 23). The north septic system was sampled (Figure 24) in six locations (MO-1 [M-1], concrete tank [M-2], MO-2 [M-3], west field drain [west cesspool of M-1], splitter tank [distribution box] and east field drain [east cesspool of M-1]). The sludge samples were analyzed for same targets as the soil samples and the results indicated that in MO-1 TCE was 18 ppb, PCE was 310 ppb, 1,2 DCE was 7 ppb, in MO-2 TCE was 160 ppb, PCE was 730 ppb, 1,2 DCE was 360 ppb and in the west field drain PCE was 16 ppb, and contaminated with several of the COCs. In March 1992, Fischer & Porter removed the northern and southwestern septic systems and a soil sampling survey was conducted concurrent with the removal of the septic systems (Figure 25). Samples were taken (Figure 26) at M-1 (northern septic [MO-1]), M-2 (northern septic concrete tank), M-3 (northern septic [MO-2]), M-4 (southwestern septic tank), C-1 (northern septic), M-1 (western cesspool) and C-2 (northern septic), M-1 (eastern cesspool). The survey results indicated that the soils at locations M-3 (S5 - PCE 6ppb) and M-1 (S1 - PCE 15 ppb) showed slight traces of PCE. The septic sludges (1500 gallons) were removed and only analyzed for disposal purposes (result - nonhazardous).

Based on a review of the available data SFO and BGWPA believe that the Fischer & Porter Company, Electronics Division facility (AKA Andrews Glass Company) has contributed PCE to the NWVGWC and does appear to be a source from which this COC was discharged, contaminating the ground water at the facility and subsequently contaminating the down gradient ground water and potable wells (Figures 13, 14 & 27). This conclusion is based on the following information.

The sludge sampling of the on-site septic systems indicated that they are contaminated with PCE, TCE and 1,2 DCE. The available data indicates that PCE was utilized in an on-site process. Fischer & Porter has stated that prior to 1988 their glassware operation on-site utilized a vapor cleaning/degreasing unit containing PCE. The rinseate from this operation was discharged to the north septic system (MO-1 [M-1]). The non-contact cooling water utilized in the vapor cleaning/degreaser discharged to the north septic system (MO-2 [M-3]) via an adjacent floor drain. Fischer & Porter began drumming waste water in September 1986. A 1986 NJDEPE investigation of the COCs detected the highest concentration of PCE in the northern septic system (TCE 35 ppb, 1,2 DCE 10 ppb, PCE 120 ppb). In the February 1991 soil vapor survey of the northern septic, PCE was detected in all samples except P-25, P-26, and P-27. The highest concentrations of PCE were seen in P-1 (13.27 ppm P-2 9.02 ppm, P-3 2.95, and P-22 6.72 ppm), these sample locations correspond closely to the

location of seepage pit MO-2. In July 1991, the northern septic system was resampled and at MO-1, and the following COC's were detected: TCE 18 ppb, PCE 310 ppb, 1,2 DCE 7 ppb; MO-2 TCE 160 ppb, PCE 730 ppb, 1,2 DCE 360 ppb. In addition, PCE was detected at 16 ppb in the western field drain. Based on the known COC discharges, the timeframe of these discharges, the proposed movement of these COCs through the aquifer (i.e., their absorption and/or retardation by colloidal particles), the calculated rate of ground water velocity and the known direction of ground water flow, it is the conclusion of SFO and BGWPA that the Fischer & Porter northern septic system is the source of the down gradient on-site monitoring well PCE contamination and that the discharges to this septic system did contribute PCE to the NWVGWC. Contouring of the available ground water data by BGWPA for the shallow (Figures 13 & 14) and deep (Figure 27) aquifers, supports the aforementioned conclusion.

Fischer & Porter's former on-site potable well (located within the building, southwest corner, depth 50-75 feet) has been documented as having been contaminated with the PCE, TCE, and 1,2 DCE (1986 - 1,2 DCE 1.5 ppb, TCE 3.4 ppb, PCE 11 ppb). Based on the known on-site and up gradient COC discharges, the timeframe of these discharges, the proposed movement of these COCs through the aquifer (i.e., their absorption and/or retardation by colloidal particles), the calculated rate of ground water velocity and the known direction of ground water flow, it is the conclusion of SFO and BGWPA that Fischer & Porter northern septic system is the most likely source of the PCE on-site potable well contamination. Contouring of the ground water data by BGWPA for the shallow aquifer (Figures 13 & 14) PCE supports the aforementioned conclusion.

The Fischer & Porter is down gradient from Shieldalloy Metallurgical Corporation (SMC). SMC has stated that between 1965 and 1967 their Manpro-Vibra degreasing unit utilized TCE and discharged its wash water into a drainage ditch. Additionally, TCE and 1,2 DCE which were identified in the ground water at the Fischer & Porter facility have also been identified in the ground water at SMC. Based on the known up gradient COC discharges, the timeframe of these discharges, the proposed movement of these COCs through the aquifer (i.e., their absorption and/or retardation by colloidal particles), the calculated rate of ground water velocity and the known direction of ground water flow, it is the conclusion of SFO and BGWPA that SMC is the most likely source of the TCE and 1,2 DCE potable well contamination at the Fischer & Porter facility. Contouring of the ground water data by BGWPA for the shallow aquifer (Figures 11, 12 and 17) supports the aforementioned conclusion.

Sludge sampling of the on-site septic systems indicated that in addition to being self contaminated with PCE, SMC is also contaminated with TCE and 1,2 DCE. The available data does not indicate that these materials were utilized in any on-site process. The former on-site potable well has been documented as having been contaminated with the TCE and 1,2 DCE. It is the conclusion of SFO and BGWPA that the septic bed contamination at the Fischer & Porter facility is probably due to bacterial concentration of the COCs in the septic organic matter and that the source of these COCs was contaminated well water that was discharged into the septic system.

It should be noted that in an old site diagram there appears to be some type of building denoted behind the Fischer & Porter building. However, the purpose or function of this building is never noted, discussed or explained.

Based on the available data SFO and BGWPA conclude that the soils at the Fischer & Porter facility are not a source of the PCE contamination of the NWVGWC. It should be noted that as the PCE plume sinks it could go undetected in some of the more shallow monitoring wells.

Shieldalloy Metallurgical Corporation

The Shieldalloy Metallurgical Corporation (SMC) is located on West Boulevard in Newfield Borough, Gloucester County and encompasses 67.5 acres (60 in Newfield, Gloucester County and 7.5 in Vineland, Cumberland County) with numerous buildings on-site (Figure 28). The facility began operation in 1955 processing ores and minerals to produce speciality metals and alloys, with numerous waste streams being generated from these operations. The SMC facility is on the National Priority List for the chrome contamination of ground water. Additionally, some site activities are regulated by the United States Nuclear Regulatory Commission.

In October 1972, the Newfield Municipal Well serving SMC and several private wells were condemned by NJDEPE and removed from service due to the presence of chromium contamination. Subsequently, the source of the chromium contamination was found to be lagoons located on the SMC site. SMC began on-site ground water recovery in 1979 pursuant to NJPDES Permit No. NJ0004103. Currently, SMC has a total of 49 monitoring wells on and off site (Figures 28 & 29), which are monitored on a regular basis. Additionally, SMC operates an upgraded ground water remediation that recovers and treats approximately 400 gallons per minute from five recovery wells. In the September 1988 report to NJDEPE, SMC described their historical use of VOCs. From 1965 to 1967 a Manpro-Vibra degreasing system was operated on-site, utilizing trichloroethylene to degrease titanium chips and cuttings which produced several waste streams (i.e., process effluents wash water, sludge/still bottoms, aqueous condensates and process venting). The wash water was released to a drainage ditch which entered the storm sewer and ultimately the Hudson Branch. The sludge/still bottoms were manually removed, drummed and stored on-site. These wastes may have been on-site until 1980 and this office is unaware of their ultimate disposal. The aqueous condensate was manually drained from water solvent separator and discharged to the drainage ditch. These condensates are presumed to contain TCE and the process vent went directly to the atmosphere. SMC began sampling the ground water for VOCs in 1983 and began detecting TCE, DCE, and PCE.

TCE and 1,2-DCE are the primary VOCs found in both SMC's on and off site monitoring wells (Figure 30). The 1990 SMC remedial investigation shows TCE and 1,2-DCE at highest concentrations in the monitor well closest to the former Manpro Degreaser location (SMC monitor well 20s) and in the down gradient wells E and K. Data from 1990 revealed that PCE was found at the highest concentrations in the on-site monitoring wells W-9 (9.4 ppb) and SC-6D (5.3 ppb).

Based on a review of the available data SFO and BGWPA believe that the SMC facility has contributed TCE, TCA and 1,2-DCE to the North West Vineland ground water VOC contamination and does appear to be a source from which these COCs were discharged, contaminating the ground water at the facility and subsequently contaminating down gradient potable wells. This conclusion is based on the following information.

The SMC site is the most up gradient of the investigated facilities and their use of TCE is well documented. Some of the on-site VOC contamination of ground

water is known to be composed primarily of TCE, TCA, 1,2 DCE and to a lesser extent PCE. SMC's Manpro-Vibra degreasing unit utilized TCE and discharged its wash water into a drainage ditch. These waste management practices were employed on-site between 1965 and 1967 which strongly indicate that it may be the source of the on-site VOC contamination. The timeframe of the COC discharge would be consistent with known data on ground water velocity (Figure 10, 31 & 32 shallow - 1.2 ft. per. day, deep - 1.5 ft. per. day) and direction so as to be identified as a logical and viable source of the contamination noted in the down gradient monitor and homeowner wells. Contouring of the available TCE (Figures 33, 34 & 35) and TCA (Figures 15 & 16) data by BGWPA for the shallow and deep aquifers, supports the aforementioned conclusion.

Additionally, contouring of the available 1,2-DCE data (Figure 17) indicates the SMC site is the source of this COC. This is based on 1,2 DCE as a principal degradation product of TCE and TCA. The BGWPA contouring maps indicates that a single, continuous VOC plume is emanating from the former Manpro Degreaser location on the SMC site. This plume is contiguous in nature and is seen to be moving away from the SMC site as indicated by a decrease in the concentration gradient. The area's deeper ground water is observed to alter direction from south-southwest to southwest and the plume is observed to follow this flow. With increased distance from the source the plume would logically be expected to widen and the concentration gradient increase. The SMC off site recovery well system (RW-6s and RW-6d) is assumed to have shaped the plume into its current long and narrow configuration. SMC has advanced the idea that the chromium and VOC plumes are similar in configuration. SFO and BGWPA have concluded that the chromium and VOC plumes can not be directly analogized to each other due to the concentration differences in monitoring levels and the disparate nature of their transport through the aquifer system.

United Parcel Service

The former United Parcel Service (UPS) facility is located at 3690 North West Boulevard and encompasses approximately 2 acres. The existing 7,400 sq. ft. building was constructed in 1965 and this property was purchased by SMC in 1971.

Unsubstantiated allegations have been made which suggest that solvents were stored on the UPS site and used for the routine cleaning of their delivery trucks. An examination of the grounds and building exterior by SFO and BGWPA did not reveal any indication of current or former underground storage tanks (UST) on-site.

Based on a review of the available data SFO and BGWPA believe that COCs of the North West Vineland ground water VOC contamination do not appear to be sourced from the former UPS facility. These conclusions are based on the available data and ground water contouring.

North Vineland Car Wash

The North Vineland Car Wash is a five bay, coin operated self-service facility located at 130 West Weymouth Road. On May 5, 1993, the site was investigated by SFO and BGWPA and found to be in violation of the Spill Compensation and Control Act, specifically 58:10-23.11c and 58:10-23.11e.

The contaminant of concern on-site appears to be waste oil. The presence of chlorinated solvent discharges is unknown at this time and the site has no prior history of NJDEPE violations. The owner of the site signed a Memorandum

of Agreement with the Department in July 1993, but has not submitted a Remedial Investigation Report to date.

Based on a review of the available data there is not enough information available to determine if this site is related to the COCs of the North West Vineland ground water VOC contamination.

Research Glass of New Jersey

The Research Glass Of New Jersey (Research Glass) facility is located at 3770 North West Boulevard, and is owned and operated by Robert Forgnoni. Research Glass is a hand-tooled glass operation, making custom glassware from stock glass tubing. No etching is performed on-site and chemicals processes are not used in the tooling or cleaning of the products. The glass is washed with a non-phosphate detergent in a ultrasonic cleaner and the rinsewater is discharged to the septic system. The Research Glass septic bed was sampled by DWR on April 18, 1986 for VOC and issued NJPDES permit No. NJ0063541 on November 15, 1987. DWR referred the case to SFO on May 25, 1990 on the assumption that quarterly monitoring well sampling results indicated a possible leaking UST (LUST) on-site. The on-site UST was removed on August 14, 1990 and was found not to be leaking.

Based on a review of the available data SFO and BGWPA believe that COCs of the North West Vineland ground water VOC contamination do not appear to be sourced from the Research Glass facility. These conclusions are based on ground water contouring and the available site and data.

Marshall Services Incorporated

Marshall Services Incorporated (MSI) is located at Pearl and Church Streets, Newfield Borough, Gloucester County and is owned by Everett Marshall, is a tank truck operation that hauls petroleum products. MSI has been investigated by DWR, SFO and RCRA and has been cited for violations of the Water Pollution Control Act (specifically, NJSA 58:10A-6) and the Spill Compensation and Control Act (specifically, 58:10-23.11c and 58:1023.11e), which have since been resolved. The contaminants of concern on-site appear to have been non-chlorinated hydrocarbons. DWR's April 3, 1986 sampling event at MSI did not indicate the presence of the NWVGW COCs.

SFO and BGWPA believe that COCs of the North West Vineland Ground Water VOC contamination do not appear to be sourced from the MSI facility. These conclusions are based on ground water contouring and the available data.

Gelsi Auto Repair (AKA. Gelsi Mustang)

Gelsi Auto Repair is located at 3576 North West Boulevard and is owned by Romeo Gelsi. DWR's June 14, 1986 sampling event at MSI did not indicate the presence of the NWVGW COCs. Gelsi has a UST on-site that is being handled by Bureau of Under Ground Storage Tanks. On August 29, 1988, DWR and Bureau of Ground Water Quality Management eliminated Gelsi as a PRP in the NWVGWC.

SFO and BGWPA believe that COCs of the North West Vineland Ground Water VOC contamination do not appear to be sourced from the Gelsi Auto Repair facility. These conclusions are based on ground water contouring and the available data.

Dauito's Express

Dauito's Express (DE) is a trucking company located 3256 North West Boulevard and is owned by Anthony Dauito Sr. The DWR sampled DE's potable well and soils on May 15, 1986 and the soil samples were found to have high total petroleum hydrocarbon content but did not contain the NWVGW COCs. The on-site potable well was found to be contaminated with TCE. On August 29, 1988, DWR and Bureau of Ground Water Quality Management eliminated DE as a PRP in the NWVGWC. In 1989, sloppy housekeeping problems were discovered by SFO on-site by DE and its sublessee ABC Tank Company (ABC). Final remediation of the on-site contamination was completed in February 1992.

SFO and BGWPA believe that COCs of the North West Vineland ground water VOC contamination do not appear to be sourced from the DE facility. These conclusions are based on ground water contouring and the available data.

Industrial Diesel

Industrial Diesel (ID) is a heavy truck repair shop located at 256 Weymouth Road and is owned by Dennis Pangburn. The DWR sampled ID's soils on May 13, 1986 and the on-site soils were found to be contaminated with petroleum hydrocarbons and metals but did not contain the NWVGW COCs. ID was required to install monitoring wells on September 4, 1986. On August 29, 1988 DWR and Bureau of Ground Water Quality Management concluded that ID was not a PRP in the NWVGWC.

SFO and BGWPA believe that COCs of the North West Vineland Ground Water VOC contamination do not appear to be sourced from the ID facility. These conclusions are based on ground water contouring and the available data.

CONCLUSION:

Based on a review of the available data SFO and BGWPA believe that the COCs of the NWVGWC do not appear to be sourced from the Wheaton Industries' Galena Lead Crystal facility and that the COC ground water contamination found at the facility does not appear to have been caused by discharges from the facility. The Galena facility is down gradient from Shieldalloy Metallurgical Corporation (SMC), Fischer & Porter Company and several other PRPs. SMC has stated that between 1965 and 1967 their Manpro-Vibra degreasing unit utilized TCE and discharged its wash water into a drainage ditch. Fischer & Porter has stated that prior to September 1986, PCE was used on-site and discharged to seepage pits. Additionally, the COCs identified in the ground water at the Galena facility have also been identified in the ground water at SMC and Fischer & Porter.

It is the conclusion of SFO and BGWPA that the septic bed contamination at the facility is most probably due to bacterial concentration of the COCs in the septic organic matter and that the source of these COCs was contaminated well water that was discharged into the septic system.

Based on a review of the available data SFO and BGWPA believe that the Fischer & Porter Company, Electronics Division facility (A.K.A. Andrews Glass Company) has contributed PCE to the NWVGWC and does appear to be a source from which this COC was discharged, contaminating the ground water at the facility and subsequently contaminating the down gradient ground water and potable wells. This conclusion is based on the following information.

The available data supports the contention that the PCE plume is sourced at the Fischer & Porter facility and that the PCE plume is sinking and subsequently impinging on the deeper aquifer as it moves down gradient from the Fischer & Porter facility. It should be noted that as the plume sinks it may go undetected in some of the more shallow monitoring wells.

SFO and BGWPA believe that the SMC facility has contributed TCE, TCA and 1,2-DCE to the North West Vineland ground water VOC contamination and does appear to be a source from which these COCs were discharged, contaminating the ground water at the facility and subsequently contaminating down gradient potable wells. This conclusion is based on the following information. The SMC site is the most up gradient of the investigated facilities and their use of TCE is well documented. The on-site VOC contamination of ground water is known to be composed primarily of TCE, TCA, 1,2 DCE and to a lesser extent PCE.

SMC's Manpro-Vibra degreasing unit utilized TCE and discharged its wash water into a drainage ditch. The waste management practices employed on-site during the operation of the Manpro degreaser (1965-1967) strongly indicate that it is the source of the on-site VOC contamination. The timeframe of the COC discharge is in keeping with known data on ground water velocity and direction so as to be identified as a logical and viable source of the contamination noted in the down gradient monitoring and homeowner wells. Contouring of the available TCE, TCA and 1,2 DCE data by BGWPA for the shallow and deep aquifers, supports the aforementioned conclusion. The BGWPA contouring maps indicates that a single, continuous VOC plume is emanating from the former Manpro Degreaser location on the SMC site and is seen to be sinking away from the SMC site. The SMC off site recovery well system (RW-6s and RW-6d) is assumed to have shaped the plume into its current long and narrow configuration.

SFO and BGWPA believe that COCs of the North West Vineland Ground Water VOC contamination do not appear to be sourced from the former UPS facility, Research Glass of New Jersey facility, Marshall Services Incorporated facility, Gelsi Auto Repair facility, Dauito's Express facility, or the Industrial Diesel facility. These conclusions are based on the available data and ground water contouring.

RC/CJD

c Donna Gaffigan, State Case Management
Rick Yarsinski, Environmental Claims Administration
Tim Maguire, BGWPA
case file #06-14-70

ATTACHMENT 2

Internal NJDEP Memo, February 27, 2002

From: Nick Sodano
To: Boyer, John
Date: 2/27/02 9:08AM
Subject: Shield data

John, Im working on the "North Vineland Ground Water Contamination" case and have nearly concluded the following: Wheaton Industries' Galena facility was a source (even though DEP has said it wasnt).

One fairly crucial link in proving this is the Shield data. I need to get my hands on ground water data pre-1989. I have not had luck so far, but Donna's 20 cabinets of data still beckon. **But perhaps you can save me that work if you have the data summarized.**

Wheaton will try to say that the scorching high levels of TCE, DCE in their MWs (7000, 10,500 respectively) was due to a "slug" which came from Shield. If Shield VOC data from the mid to late 80s (especially shallow perimeter wells) show levels in the 100s of ppb (not 1000s) then Wheaton's argument falls. Can you help?


Thanks,

Nick Sodano
Bureau of Site Assessment
nsodano@dep.state.nj.us
609-584-4275

CC: Gaffigan, Donna; Nicholas, George

ATTACHMENT 3

NJDEP email from NJDEP to Alcan, Inc., March 2, 2005


From: Nick Sodano
To: ellen.biaselli@alcan.com
Date: 3/2/05 3:20PM
Subject: Receipt by Alcan of NJDEP Report

Dear Ms. Biaselli:

Thank you for confirming your receipt of the Wheaton report from this office. I understand that at this time, Mr. Jim Valenti is seeking guidance from Carol (at the global corporate level) regarding which person in the organization will have the assignment of responding to the noted report.

The DEP re-evaluated the former Wheaton site and determined that discharges occurred there during the tenure of Wheaton. The report documents this conclusion and indicates that Alcan is responsible for carrying out additional remedial efforts at the site. Be advised that this office is obligated to complete an Expanded Site Investigation (ESI) at the site and to submit an ESI report to USEPA.

I understand that someone at Alcan must be given the responsibility of reviewing the document and that this will take some time. While we are willing to wait a reasonable period for this to occur, be advised that our obligation to complete the ESI means that if Alcan will not proceed with the investigation, we must. I would be happy to help whoever is assigned with working through the report, but I would expect that could be completed within the next 30 to 45 calendar days. If it can't for extenuating circumstances I trust that you will tell us and we will work with you.

However, if we do not hear from Alcan in this matter, we will conclude that we must proceed with the investigation using public funds. Likewise, if Alcan does decide to conduct the investigation under a Memorandum of Agreement (MOA), be advised that there are minimum standards for the ESI and that should NJDEP determine that any proposal by Alcan does not meet the needs of the ESI, we will not enter into the MOA and will conduct the investigation using public funds.

Thanks,

Nick Sodano
Bureau of Environmental Measurements & Site Assessment
nick.sodano@dep.state.nj.us
Ph: 609-584-4275
Fax: 609-584-4298

1st Call Jim Valenti 856-825-1400 x2929 (3/7/05)

ATTACHMENT 4

***Internal NJDEP memo: North Vineland Groundwater Contamination, Vineland City,
Cumberland County, Undated (post 2005)***

? DATE

North Vineland Ground Water Contamination Vineland City, Cumberland County

PRPs

- a. Wheaton Industries
- b. North Vineland Car Wash
- c. Jay Mar Laundry

Status:

This case has no GWIA document. The Bureau of Field Operations issued a 1994 unknown source Memo which found that the Wheaton site was not a source of ground water contamination and thereby released it from responsibility for North Vineland GW Contamination. During 1999 ISRA issued a NFA for the Wheaton site. In 2005 BEMSA completed a SI for the Wheaton Site which found that Wheaton provided ISRA incorrect information about the site. The Wheaton SI also found that some ground water contamination at site is attributable to Wheaton operations at the site. The SI further found that PCE and TCE discovered in ground water at the site is not distinguishable those contaminants found at the adjacent Car Wash site. Therefore an ESI is proposed for Wheaton which involves the installation of wells and the completion of a bromide tracer test. Another nearby site formerly known as Jay Mar Laundry is known to have existed from Fire Department records, but no records were found describing the type of laundry operations. Therefore, a workplan for Geoprobe ground water sampling has been drafted. BEMSA finds that further potable well sampling in the area is not necessary.

Next Steps

Complete ESI Tracer Test Workplan. USGS will provide training for electrode equipment in possession of Frank Sorce (Workplan requires dedicated tubing and small bailers for each well.)
Complete USI Workplan for Jay Mar Laundry

Notes:

- a. DAG Faranoff is in negotiations with Andrews Glass for settlement on the Spill Fund Cost Recovery. He is waiting for the outcome of the ESI to determine if either Wheaton and or the Car Wash are RPs which will inform his settlement negotiations. Keep DAG informed of progress.
- b. Keep ISRA informed of outcome of ESI for their deliberations on the NFA issued to the Wheaton Site.

ATTACHMENT 5

*Memorandum from NJ Bureau of Environmental Measures & Site Assessment to Deputy
Attorney General, NJ Division of Law, August 16, 2007*



State of New Jersey

JON S. CORZINE
Governor

Department of Environmental Protection
Site Remediation and Waste Management Program
Division of Remediation Support
Bureau of Environmental Measurements and Site Assessment
PO Box 407
Trenton, New Jersey 08625-0407
(609) 584-4280

LISA P. JACKSON
Commissioner

MEMORANDUM

*** CONFIDENTIAL ***

TO: Joseph Fanaroff, DAG
NJ Division of Law

FROM: Jill Dunphy, Senior Geologist
Bureau of Environmental Measurements & Site Assessment

DATE: August 16, 2007

SUBJECT: Wheaton / Andrews Glass case

Mr. Fanaroff:

I regret to inform you that at this point, despite our best efforts to expedite the analysis of the data that we have at this point, we can provide you with no additional information for this case for your conversation with the judge scheduled for 17 August 2007.

To this date, we have collected over four hundred (400) groundwater samples from forty (40) monitoring wells during our bromide tracer test that began with daily sampling in May and which is still ongoing every other week. The results have been thusfar inconclusive in determining groundwater flow direction. I have already reanalyzed many of the samples in hopes of finding more concise results, and that reanalysis has also proved inconclusive based on the data interpretation we've had time to complete to this point. One bit of information we were able to glean from the analysis is that groundwater flow in this area is much more complex than we'd originally thought.

Groundwater elevation data collected in the field show us that the groundwater table and therefore the gradient in the area is very flat, supporting the above conjecture of a complex groundwater flow regime, and making determination of flow direction difficult. Based on rough calculations made with limited groundwater elevation data from May 2007, we have found that groundwater in the area is flowing in a generally southern

direction. We have observed slight mounding conditions in the septic area. We are planning for more specific interpretations and calculations in order to determine groundwater flow in this area as accurately as possible.

We have requested expedited analysis for the volatile organic (VO) compound analysis of the forty (40) groundwater samples collected on July 31, 2007, and we still have not received the data back from the lab. We expect to receive this data, as well as data validation, within the month of August. I will contact you when we have evaluated this data. I fully expect that we can have some answers, at least in regards to the Andrews Glass portion of this case, sometime during the fall of 2007.

Please do not hesitate to contact me if I can be of further assistance.

ATTACHMENT 6a

***New Jersey Department of Environmental Quality Air Pollution Control Permit Program,
Bureau of New Source Review - Various Permits for Wheaton Industries Chrome Plating
Equipment***



HH

* Plant @
158 W. Weymouth
- CHROME -

DIVISION OF ENVIRONMENTAL QUALITY
AIR POLLUTION CONTROL PERMIT PROGRAM
BUREAU OF NEW SOURCE REVIEW
CN 027

TRENTON, NEW JERSEY 08625

Date: 8/22/91

PRECISION PLASTIC MODEL COMPAN
SCOTT GIBSON
1889 S. SPRING RD
VINELAND , NJ, 08360-0000

AUG 27 1991

Plant Location: VINELAND
County: CUMBERLAND
Applicant's Designation of Stack: VENT 2
Application Log #: 01911647
Approval Date: 8/16/91
Approval Status Code: 51

PERMIT TO CONSTRUCT, INSTALL OR ALTER CONTROL APPARATUS OR
EQUIPMENT

This permit is being issued under the authority of chapter 106,
P.L. 1967 (N.J.S.A. 26:2C-9.2). You may construct, install, or
alter the control apparatus or equipment as indicated on the
application referenced above.

The Status of this approval is referenced above.
Please see page 2 of this letter for the explanation the status
code.

You will be sent Form VEM-017 at a later date. Form VEM-017 will
include your New Jersey Plant ID Number, New Jersey Stack Number,
and Certificate Number.

If you have any questions regarding this document, please write to
the Bureau of New Source Review at the above address. Questions
regarding Certificates to Operate should be directed to the
Regional Office.

Approved by:

Chief

C: BNSR File
Regional Office

NJ DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF ENVIRONMENTAL QUALITY

BUREAU OF NEW SOURCE REVIEW
AIR PERMIT ENGINEERING

PERMIT REVIEW FORM

Permit Category:2

Log Number:01911647

A/ Date Received:910416

Cancel Permit:0071008

ID/Stack#:

Company:PRECISION PLASTIC MODEL COMPAN

Legal Action:0

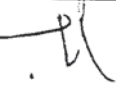
Stack Designation:VENT 2

Source Code:5000

B/ Controls:SCRUBBER

Control Code:0400

CONTAMINANT	WITHOUT CONTROL		WITH CONTROL		EFF	NJAC 7:27-
	LB/HR	TON/YR	LB/HR	TON/YR		
Particulate	.001	.001	.001	.001	90.000	6.2
PM10	.000	.000	.000	.000	.000	
SO2	.000	.000	.000	.000	.000	
NO2	.000	.000	.000	.000	.000	
CO	.000	.000	.000	.000	.000	
VOS(TOTAL)	.000	.000	.000	.000	.000	
TVOS(TOTAL)	.000	.000	.000	.000	.000	
Pb	.000	.000	.000	.000	.000	
	.000	.000	.000	.000	.000	
	.000	.000	.000	.000	.000	
	.000	.000	.000	.000	.000	
	.000	.000	.000	.000	.000	
	.000	.000	.000	.000	.000	

Evaluator:JAC 

Date Completed:910816

Time Units:0024

APPLICABLE REGULATIONS

PSD:N NSPS:0000 NESHAPS: TVOS:N RISK:N MODEL:N PINELANDS:N TCPA:N RCRA:0

EMISSION CHANGE:D (Increase/Decrease/No Change)

RECOMMENDATION

APPROVE

P/CT NOT REQUIRED

X APPROVE W/
CONDITIONS

STACKTEST
ODOR
OPACITY

DISAPPROVE

DENY

CANCEL

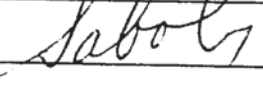
X OTHER (ATTACHED)

INSPECTION PRIORITY L (High/Medium/Low)

C/ SUPERVISOR _____ DATE __/__/__ | CONCUR | | DO NOT CONCUR

ADDITIONS _____ LETTER # 0151 P/CT STARTUP _____

D/ SECTION CHIEF  DATE __/__/__ | CONCUR | | DO NOT CONCUR

E/ BUREAU CHIEF  DATE 8/16/91 | ☒ APPROVE | | DISAPPROVE

F/ DISAPPROVAL CONCUR _____ DATE __/__/__ APEDS entry date __/__/__

CONDITIONS FOR PERMIT TO CONSTRUCT
AND CERTIFICATE TO OPERATE

BNSR LOG NO. 01-91-1647

Both the Permit to Construct, Install, or Alter Control Apparatus or Equipment and the Certificate to Operate Control Apparatus or Equipment are conditioned as follows:

1. This equipment shall not cause any air contaminant, including an air contaminant detectable by sense of smell, to be present in the outdoor atmosphere in such quantity and duration which is, or tends to be, injurious to human health or welfare, animal or plant life or property, or would unreasonably interfere with the enjoyment of life or property, except in areas over which the owner or operator has exclusive use or occupancy.
2. The Applicant shall not use the equipment in a manner which will cause visible emissions, exclusive of water vapor. Compliance with requirement shall be verified visually by the use of New Jersey Test Method 2 (N.J.A.C. 7:27B-2), or equivalent, or by opacity monitoring.
3. The equipment covered by this Permit will be subject to a maximum of two (2) periodic compliance inspections (as defined in N.J.A.C. 7:27-8.1) over the life of the Certificate, after it receives final approval for a five-year duration. After the periodic compliance inspection you will be invoiced for a \$200.00 service fee per inspection pursuant to N.J.A.C. 7:27-8.11.

EVALUATION SUMMARY

Log No 01911647 Done By TH Reviewed by ND DEP Review _____

- * If cancel permit exists, then does the deletion make sense? YES
- * Description of process(es) being permitted Chrome plating tank
- * Reason for application: moving tank

☐ SOTA requirements do not apply

☐ SOTA applies, Permit does not meet SOTA, therefore denying

☒ Permit meets the SOTA requirements, which are: scrubber
for chromic Acid control

- ☒ Application does not contain TCPA regulated chemicals.
- ☐ Application contains TCPA regulated chemicals and a copy has been forwarded to TCPA by memo for their information.
- ☒ Application is not subject to NSPS review
- ☐ Application is subject to NSPS, subpart _____
If applicable, see additional review sheets for NSPS requirements.
- ☒ Application is not subject to NESHAPS review
- ☐ Application is subject to NESHAPS, subpart _____
If applicable, see additional review sheets for NESHAPS req'ts.
- ☒ Application does not contain any TVOS as per subchapter 17.
- ☐ Application contains TVOS, see separate review sheet.

Applicable subchapters for this review are NJAC 7:27-:

6.2

Comments: Complies w/ 6.2, has SOTA
scrubber, derminimus emissions, calculation
are based on annual use of chromic acid

- ☒ Approve
- ☐ Approve with conditions
- ☐ Deny
- ☐ No permit required

minus amount plated out
so accurate, did P/CT has
 H_2SO_4 tank too, they are no longer
using this so no new P/CT needed

PARTICULATES

7:27-6.2

SOURCE

Chronic Plate Tank

NEW SOURCE

☒ MODIFICATION: moving itNAME OF PARTICULATE(S) Chronic Acid

* CHECK ONE

☐ HYDROCARBON WITH VAPOR PRESSURE LESS THAN 0.02 PSIA☐ SOLID PARTICULATES☒ LIQUID PARTICULATESACFM 5000TEMPERATURE 70 F

1) ADJUSTMENT TO STANDARD CONDITIONS IF OVER 3000 ACFM

$$\text{SCFM} = \text{ACFM} \times \frac{530}{460 + (\quad)} \times \frac{F}{\quad}$$

2) CALCULATION OF ALLOWABLE EMISSIONS

* IF EMISSIONS GREATER THAN DEMINIMUS WITH CONTROL, USE A
IF DEMINIMUS EMISSIONS OR NO CONTROL, USE B

A) BASED ON 99 PERCENT CONTROL EFFICIENCY:

* IF LB/HR > 3000 BEFORE CONTROL, THEN ALLOWABLE = 30 LB/HR

$$\frac{\text{LBS/HR}}{\text{BEFORE CONTROL}} \times 0.01 = \frac{\quad}{\quad} \begin{matrix} \text{ALLOWABLE} \\ \text{ACTUAL} \end{matrix}$$

B) BASED ON ACFM FROM SOURCE:

* IF UNDER 3000 ACFM, THEN ALLOWABLE = 0.5 LB/HR

$$\text{SCFM} \times 1.71429 \times 10^{-4} = \frac{0.5}{3 \times 10^{-6}} \begin{matrix} \text{LB/HR ALLOWABLE} \\ \text{LB/HR ACTUAL} \end{matrix}$$

COMPLIANCE =====>>>> ☒ YES ☐ NO

* CHECK ONE

☐ OLD CONTROL DEVICE☐ NEW CONTROL DEVICE WITH 99% EFFICIENCY☒ DEMINIMIS EMISSIONS, SOA DOES NOT APPLY☐ NONECONTROL DEVICE ScrubberEFFICIENCY 90%

BUREAU OF NEW SOURCE REVIEW

CATEGORY 2

**APPLICATION FOR
PERMIT TO CONSTRUCT, INSTALL OR ALTER CONTROL APPARATUS OR EQUIPMENT
AND
CERTIFICATE TO OPERATE CONTROL APPARATUS OR EQUIPMENT**

TO: New Jersey Department of Environmental Protection
Bureau of New Source Review
CN 027, Trenton, N.J. 08625-0027

PAID - BNSR

DATE: 4-18-91

AMOUNT: 1,000

Read Instructions Before Completing Application

SECTION A	1. Full Business Name	<u>Precision Plastic Model Company</u>				
	2. Mailing Address	<u>1889</u>	<u>S. Spring Rd.</u>	<u>Uiveland</u>	<u>Cumb.</u>	<u>N.J. 08360</u>
		No.	Street	City	County (if NJ)	State Zip Code
	3. Division and/or Plant Name	<u>Precision Plastic Model Company</u>				
	4. Plant Location	<u>158</u>	<u>W Weymouth Rd.</u>	<u>Uiveland</u>	<u>Cumb.</u>	<u>N.J.</u>
	No.	Street	City	County		
	5. Location of Equipment on Premises (bldg., dept., area, etc.)	<u>SAME</u>				
SECTION B	REASON FOR APPLICATION (Check One)					
	<input type="checkbox"/> New Equipment without Control Apparatus			<input checked="" type="checkbox"/> Modification to Existing Equipment		
	<input type="checkbox"/> New Equipment with Control Apparatus			<input type="checkbox"/> Modification to Existing Control Apparatus		
	<input checked="" type="checkbox"/> New Control Apparatus on Existing Equipment			<input checked="" type="checkbox"/> Five Year Renewal of Certificate No. <u>071008</u>		
	<input checked="" type="checkbox"/> Other (Explain) <u>Moving to New Location</u>					
	1. Nature of Business <u>PLASTIC Mold Development</u>					
	2. Estimated Starting Date of Construction <u>June 1, 1991</u>					
	3. Date Equipment to be put in use <u>July 1, 1991</u>					
	4. Plant Contact <u>Scott Gibson</u>		<u>Manager</u>		<u>609-692-8902</u>	
	Name (print or type)		Title		Telephone No.	
	5. APC Plant ID					
SECTION C	STACK INFORMATION (EQUIVALENT STACK INFORMATION)					
	1. Company Designation of Stack(s) <u>Vent # 2</u>					
	2. Previous Certificate Numbers (if any for this stack) <u>071008</u>					
	3. a. Number of Sources Venting to this Stack <u>1</u> (Complete a separate VEM-004 for each source)					
	b. Number of Stacks Venting Source Operation(s) <u>1</u> (Complete a separate VEM-003 for each stack)					
	4. Distance to the nearest Property Line (ft.) <u>50'</u>					
	5. Stack Diameter (inches) <u>10"</u>					
6. Discharge Height Above Ground (ft.) <u>25' 30"</u>						
7. Exit Temperature of Stack Gases <u>75°F</u>						
8. Vol. of Gas Discharged at Stack Conditions (ACFM) <u>2500 CFM</u>						
9. Discharge Directions: <input type="checkbox"/> Horizontal <input checked="" type="checkbox"/> Up <input type="checkbox"/> Down						

I certify under penalty of law that the information provided in this document is true, accurate and complete. I am aware that there are significant civil and criminal penalties, including fines or imprisonment or both, for submitting false, inaccurate or incomplete information.

Scott Gibson
Name (print or type)

Manager
Title

Scott Gibson
Signature

4/9/91
Date

This application will not be processed unless proper fee is submitted.

FOR ASSISTANCE CALL 1-800-441-0065

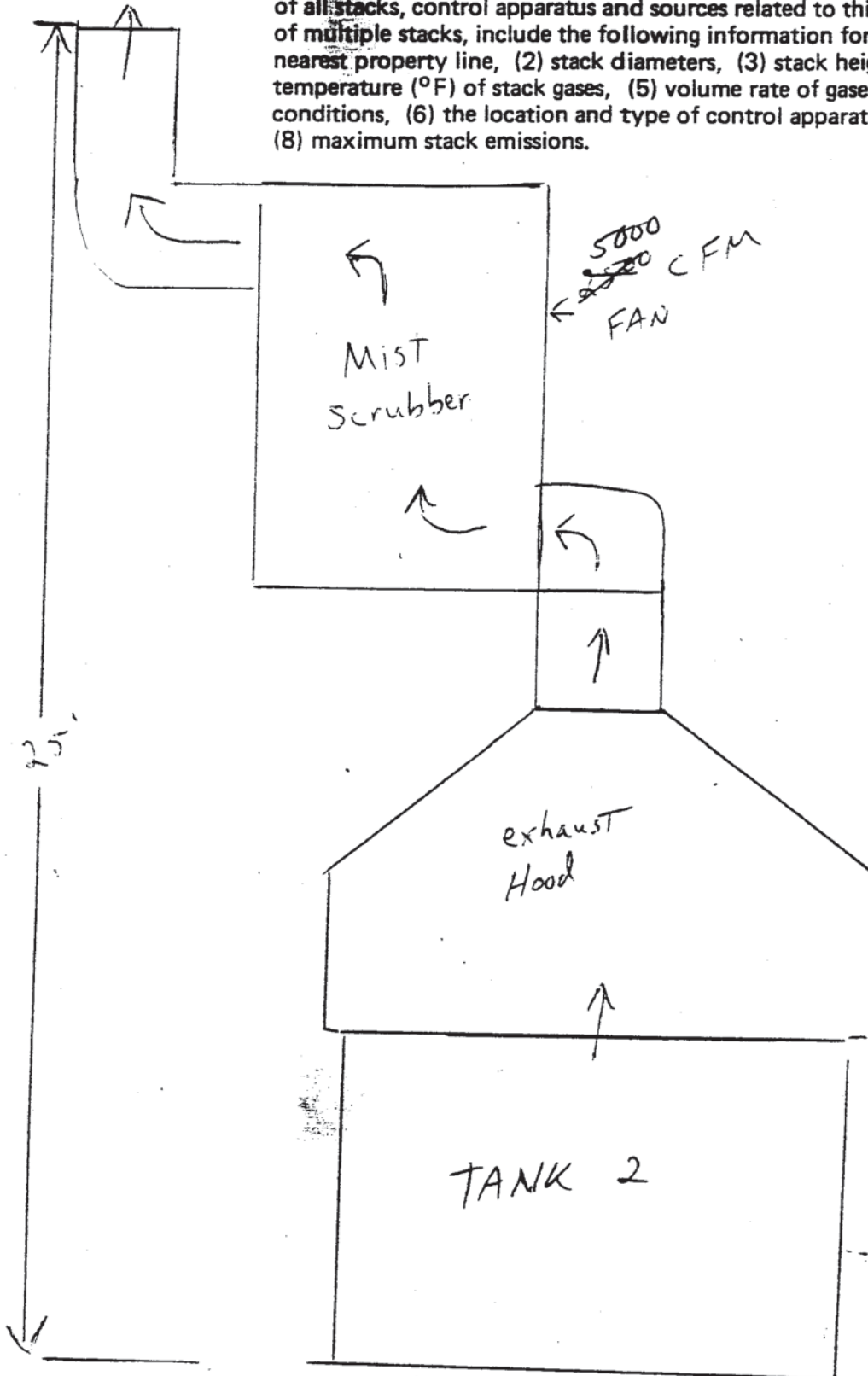
FOR DEPARTMENT USE ONLY

Log No. 01-91-1164

Fee _____ Eval. _____

SECTION D

DIAGRAM INSTRUCTIONS - A diagram must be included showing the configuration of all stacks, control apparatus and sources related to this application. NOTE: In cases of multiple stacks, include the following information for each stack: (1) distance to nearest property line, (2) stack diameters, (3) stack height above ground, (4) exit temperature ($^{\circ}\text{F}$) of stack gases, (5) volume rate of gases (ACFM) discharged at stack conditions, (6) the location and type of control apparatus, (7) direction of flows, and (8) maximum stack emissions.



NEW JERSEY STATE DEPARTMENT

OF ENVIRONMENTAL PROTECTION

BUREAU OF NEW SOURCE REVIEW

APPLICATION FOR
PERMIT TO CONSTRUCT, INSTALL OR ALTER CONTROL APPARATUS OR EQUIPMENT
AND
CERTIFICATE TO OPERATE CONTROL APPARATUS OR EQUIPMENTSource Emissions and Source Data Form
(Complete this form for each source and submit
with application Form VEM-003)

399999 94

SECTION E				
SOURCE INFORMATION				
1. Source Description <u>Chromium Plating tank</u>				
2. Operating Schedule				
<u>8</u> Hours/Day		<u>2088</u> Hours/Year	<u>July 1ST, 1991</u> Operation Starting Date	
3. % Annual Production Throughput By Quarter				
<u>25%</u> Jan.-Mar.		<u>25%</u> Apr.-June	<u>25%</u> July-Sept.	<u>25%</u> Oct.-Dec.
4. Volume Of Gas Discharged From This Source (ACFM) <u>5000</u> <u>2500</u> CFM				
Source Discharge Temperature (°F) <u>75%</u>				
SECTION F				
CONTROL APPARATUS ON SOURCE				
Primary <u>MIST Scrubber</u>		Capital Cost (Dollars) <u>6,000.</u>	Annual Operating Cost (Dollars) <u>\$500.</u>	No. of Sources Connected <u>2</u>
Secondary _____		_____	_____	_____
Tertiary _____		_____	_____	_____
SECTION G				
AIR CONTAMINANTS FROM SOURCE				
CONTAMINANT NAME		Maximum Emissions w/o Control (lbs./hr.)	Maximum Emissions with Control (lbs./hr.)	How Determined
<u>Chronic Acid H₂CrO₄</u>		<u>0.04</u> <u>3.0X10⁻⁵</u>	<u>0.008</u> <u>3.0X10⁻⁶</u>	<u>4</u>
_____		_____	_____	_____
_____		_____	_____	_____
_____		_____	_____	_____
_____		_____	_____	_____
_____		_____	_____	_____
_____		_____	_____	_____
_____		_____	_____	_____
* Use VEM-004 Supplement if additional space is required.				

TO INSURE PROPER COORDINATION BETWEEN VEM-003 and VEM-004 FORMS, INSERT IDENTICAL COMPANY NAME AND DESIGNATION OF STACK FROM VEM-003, SIDE 1.

Full Business Name: Precision Plastic Model company
Company Designation of Stack(s) Vent # 2

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF ENVIRONMENTAL QUALITY

ADDITIONAL INFORMATION FOR SCRUBBERS

01-91-1647

1. Is the scrubber being used for gas absorption or particulate control? **GAS absorption**
2. If the scrubber is used for gas absorption, answer the following questions:
- What are the gases being absorbed? **chromic acid**
 - What is the liquid being used for absorption? **WATER**
 - Are there any chemical additives in the liquid? Give their chemical names. **NO**
 - What are the concentration of the chemical additives? How is concentration of additives maintained?
 - Is the liquid once-through or recirculated? **recirculated**
 - How is the liquid disposed of, after absorption? **recirculated, back in chrome tank**
 - What is the type of scrubber (venturi, packed tower, etc.)? **packed tower**
 - What is the type of mist eliminator?

3. If the scrubber is used for particulate control, attach a particle size distribution analysis.

4. If it is a venturi scrubber, give the following information:

N/A

~~Sketch of the scrubber~~
~~Length of the throat~~
~~Diameter of the throat~~
~~Mechanism of introduction of the liquid (nozzles, pipes, etc.)~~
~~Type of nozzle(s)~~
~~Relative direction of gas and liquid flow (co-current, counter-current, crossflow)~~
~~Flow rate of the liquid~~
~~Flow rate of the gas (ft³/sec) and (ft/sec)~~
~~Pressure drop across the scrubber~~
~~Type of mist eliminator and dimensions~~
~~Inlet gas temperature (°F)~~
~~Outlet gas temperature (°F)~~

5. If it is a packed tower, give the following information:

See Attachment:

~~Sketch of the scrubber~~
~~Number of transfer units~~
~~Height of a transfer unit~~
~~Type of packing material with size~~
~~Relative direction of gas and liquid flow~~
~~(co-current + counter-current)~~
~~Flow rate of gas (ft³/sec) and (ft/sec)~~

Flow rate of liquid (gal/min)
Pressure drop across the scrubber
Type of mist eliminator and dimensions
Diameter of tower (ft)
Height of packed section (ft)
Total height of tower (ft)

6. If the scrubber is of a different design, give a detailed description which should include the relevant details covered in (4) and (5).

S 80

Precision Plastic Model Co.

15800 South P
Vineland, NJ 08360

(609) 691-5501

February 11, 1992

NJDEP
Division of Environmental Quality
Air Pollution Control Permit Program
Bureau of New Source Review
CN 027
Trenton, NJ 08625

Attn: Donald Patterson

Re: APC Plant No. 75203
Certificate No. 102571

Dear Mr. Patterson:

This will acknowledge with thanks the above-referenced permit.

The permit, however, contains the incorrect address of our plant location.

I have enclosed a copy of my original application along with a copy of the permit. We vacated the premises 1889 South Spring Road in August, 1991.

I would appreciate if you would amend the permit and forward a new copy. In the meantime, I will keep the permit I have on hand for inspection.

Thank you.

Very truly yours,

PRECISION PLASTIC MODEL CO.

Scott N. Gibson
President

SNG:bjg
enclosures

VEM-001

4/16/92

MSK

FEB 27 1992

NEW JERSEY STATE DEPARTMENT



OF ENVIRONMENTAL PROTECTION

DIVISION OF ENVIRONMENTAL QUALITY
AIR POLLUTION CONTROL PROGRAM

All Correspondence must indicate your APC PLANT ID NUMBER

Certificate Number 102571

APC PLANT ID 1203

(Mailing Address)

(Plant Location)

PRECISION PLASTIC MODELS COMPANY
1889 SOUTH SPRING ROAD
VINELAND NJ 08360

1889 SOUTH SPRING ROAD
VINELAND

Applicant's Designation of Equipment VENT #2

N.J. Stack No. 001

No. of Stacks 001

No. of Sources 01

Approval 08/16/91

Effective 11/14/91

Expiration 05/11/92

* TEMPORARY CERTIFICATE TO OPERATE CONTROL APPARATUS OR EQUIPMENT *

* CONDITIONAL 90 DAY EXTENSION *

THIS TEMPORARY CERTIFICATE IS BEING EXTENDED TO ALLOW FOR FURTHER
FIELD/OFFICE EVALUATION.

THIS EXTENSION SHALL NOT BE CONSTRUED TO EXTEND THE COMPLIANCE DATE(S)
OF ANY ORDER ISSUED BY OR ENTERED INTO WITH THE DEPARTMENT AS THE RESULT
OF AN ADMINISTRATIVE OR JUDICIAL ACTION.

IF THE DEPARTMENT IS SOLELY RESPONSIBLE FOR BEING UNABLE TO INSPECT THIS
EQUIPMENT IN OPERATION AS PERMITTED DURING THIS 90-DAY PERIOD, THIS
TEMPORARY CERTIFICATE WILL BE EXTENDED AUTOMATICALLY. HOWEVER, IF YOU
ARE RESPONSIBLE FOR THE DEPARTMENT'S BEING UNABLE TO INSPECT, E.G., NOT
NOTIFYING THE DEPARTMENT WHEN THIS EQUIPMENT OR PROCESS IS IN OPERATION,
THIS CERTIFICATE MAY NOT BE EXTENDED AND YOU WILL BE NOTIFIED BY THE
DEPARTMENT THAT YOU MUST APPLY FOR AND OBTAIN AN EXTENSION AUTHORIZING
YOU TO CONTINUE TO OPERATE THE EQUIPMENT. THE DEPARTMENT RESERVES THE
RIGHT TO WITHHOLD ANY EXTENSION OF THIS TEMPORARY CERTIFICATE, IN WHICH
EVENT YOU WILL BE NOTIFIED THAT YOU MUST APPLY FOR AND OBTAIN AN
EXTENSION AUTHORIZING YOU TO CONTINUE TO OPERATE AFTER THE EXPIRATION
DATE OF THIS CERTIFICATE.

IN ACCORDANCE WITH N.J.A.C. 7:27-8.3(D), THIS CERTIFICATE MUST BE
READILY AVAILABLE FOR INSPECTION ON THE OPERATING PREMISES.

PLEASE REFER TO YOUR INITIAL PERMIT APPROVAL FOR OPERATING
CONDITIONS.

Donald Patterson

Approved by: _____

APPLICATION FOR
PERMIT TO CONSTRUCT, INSTALL OR ALTER CONTROL APPARATUS OR EQUIPMENT
AND
CERTIFICATE TO OPERATE CONTROL APPARATUS OR EQUIPMENT

PAID - BNSR

DATE: 4/16/91

AMOUNT: _____

TO: New Jersey Department of Environmental Protection
Bureau of New Source Review
CN 027, Trenton, N.J. 08625-0027

Read Instructions Before Completing Application

SECTION A	1. Full Business Name	Precision Plastic Model Company			N.J.	08360
	2. Mailing Address	1889 S. Spring Rd.	Unland	County (if NJ)	State	Zip Code
	3. Division and/or Plant Name	Precision Plastic Model Company				
	4. Plant Location	158 W. Weymouth Rd.	Unland	County	N.J.	
	5. Location of Equipment on Premises (bldg., dept., area, etc.)	Same				
SECTION B	REASON FOR APPLICATION (Check One)					
	<input type="checkbox"/> New Equipment without Control Apparatus <input type="checkbox"/> New Equipment with Control Apparatus <input checked="" type="checkbox"/> New Control Apparatus on Existing Equipment <input checked="" type="checkbox"/> Other (Explain) <u>Moving to New Location</u>			<input checked="" type="checkbox"/> Modification to Existing Equipment <input type="checkbox"/> Modification to Existing Control Apparatus <input checked="" type="checkbox"/> Five Year Renewal of Certificate No. <u>609-631-5501</u>		
	1. Nature of Business <u>Plastic Mold Development</u>					
	2. Estimated Starting Date of Construction <u>June 1, 1991</u>					
	3. Date Equipment to be put in use <u>July 1, 1991</u>					
SECTION C	4. Plant Contact <u>Scott Gibson</u> <u>Manager</u> <u>609-631-5501</u> Name (print or type) Title Telephone No.					
	5. APC Plant ID _____					
	STACK INFORMATION (EQUIVALENT STACK INFORMATION)					
	1. Company Designation of Stack(s) <u>Vent #2</u>					
	2. Previous Certificate Numbers (if any for this stack) <u>071008</u>					
3. a. Number of Sources Venting to this Stack <u>1</u> (Complete a separate VEM-004 for each source)						
b. Number of Stacks Venting Source Operation(s) <u>1</u> (Complete a separate VEM-003 for each stack)						
4. Distance to the nearest Property Line (ft.) <u>50'</u>						
5. Stack Diameter (inches) <u>10"</u>						
6. Discharge Height Above Ground (ft.) <u>25'</u>						
7. Exit Temperature of Stack Gases <u>75°F</u>						
8. Vol. of Gas Discharged at Stack Conditions (ACFM) <u>2500 cfm</u>						
9. Discharge Directions: <input type="checkbox"/> Horizontal <input checked="" type="checkbox"/> Up <input type="checkbox"/> Down						

I certify under penalty of law that the information provided in this document is true, accurate and complete. I am aware that there are significant civil and criminal penalties, including fines or imprisonment or both, for submitting false, inaccurate or incomplete information.

Scott Gibson
Name (print or type)

Manager
Title

Scott Gibson
Signature

4/9/91
Date

FOR ASSISTANCE CALL 1-800-441-0065

This application will not be processed unless proper fee is submitted.

FOR DEPARTMENT USE ONLY

Log No.

01-91-1164

Fee

Eval.

NEW JERSEY STATE DEPARTMENT



OF ENVIRONMENTAL PROTECTION

DIVISION OF ENVIRONMENTAL QUALITY
AIR POLLUTION CONTROL PROGRAM
BUREAU OF ENGINEERING AND TECHNOLOGY

All Correspondence must indicate your APC PLANT ID NUMBER

Permit/Certificate Number

APC PLANT ID 75203

(Mailing Address)

(Plant Location)

PRECISION PLASTIC MODELS COMPANY
1889 SOUTH SPRING ROAD
VINELAND NJ 08360

PRECISION PLASTIC MODELS CO.
1889 SOUTH SPRING ROAD
VINELAND

Applicant's Designation of Equipment

VENT NO. 1 (ACID BATHS)

N.J. Stack No. 001

No. of Stacks 001

No. of Sources 02

Original Approval 03/21/85

Effective 03/21/85

Expiration 09/11/91 ✓

CERTIFICATE TO OPERATE CONTROL APPARATUS OR EQUIPMENT (5 YEAR)

THIS PERMANENT (5 YEAR) CERTIFICATE IS BEING ISSUED UNDER THE AUTHORITY OF CHAPTER 106, P.L. 1967 (N.J.S.A. 26:2C-9.2). THE POSSESSION OF THIS DOCUMENT DOES NOT RELIEVE YOU FROM THE OBLIGATION OF COMPLYING WITH ALL OTHER PROVISIONS OF TITLE 7, CHAPTER 27, OF THE NEW JERSEY ADMINISTRATIVE CODE.

YOU MAY BE ENTITLED TO AN EXEMPTION OF TAXATION IF YOUR EQUIPMENT IS TAXED AND IS CONSIDERED TO BE AN AIR POLLUTION ABATEMENT FACILITY. A TAX EXEMPTION APPLICATION MAY BE OBTAINED FROM THIS SECTION.

IF IT IS NECESSARY TO AMEND YOUR EMERGENCY STANDBY PLANS, PLEASE CONSULT WITH THE APPROPRIATE FIELD OFFICE. (SEE OTHER SIDE).

THIS DOCUMENT MUST BE READILY AVAILABLE FOR INSPECTION AT THE PLANT.

RECEIVED

AUG 07 1986

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF ENGINEERING AND TECHNOLOGY

N.J. Department of Environmental Protection

Division of Environmental Quality

CN-027

Trenton, New Jersey 08625

Approved by

Supervisor

New Source Review Section

ENVIRONMENTAL QUALITY
DEPARTMENT OF ENVIRONMENTAL PROTECTION

NEW JERSEY STATE DEPARTMENT



OF ENVIRONMENTAL PROTECTION

DIVISION OF ENVIRONMENTAL QUALITY
AIR POLLUTION CONTROL PROGRAM
BUREAU OF ENGINEERING AND TECHNOLOGY

All Correspondence must indicate your DEP PLANT ID NUMBER

Permit/Certificate Number 071058 LOG NUMBER 852421A DEP PLANT ID 75203

(Mailing Address)

(Plant Location)

PRECISION PLASTIC MODELS COMPANY
1889 SOUTH SPRING ROAD
VINELAND NJ 08360

PRECISION PLASTIC MODELS
1889 SOUTH SPRING ROAD
VINELAND

Applicant's Designation of Equipment

N.J. Stack No. 501

Original Approval

VENT NO. 1 (ACID BATHS)

No. of Stacks 501

Effective 03/21/85

No. of Sources 02

Expiration 06/16/85

PERMIT TO CONSTRUCT, INSTALL OR ALTER CONTROL APPARATUS OR EQUIPMENT
AND
CERTIFICATE TO OPERATE CONTROL APPARATUS OR EQUIPMENT (90 DAY)

THIS PERMIT AND TEMPORARY CERTIFICATE IS BEING ISSUED UNDER THE
AUTHORITY OF CHAPTER 106, P.L. 1967 (N.J.S.A. 26:2C-9.2). THE TEMPORARY
CERTIFICATE WILL ALLOW FOR INSPECTION AND EVALUATION TO ASSURE
CONFORMANCE WITH YOUR PERMIT AND WITH ALL OTHER PROVISIONS OF TITLE 26,
CHAPTER 27, OF THE NEW JERSEY ADMINISTRATIVE CODE. BASED ON THIS
EVALUATION STACK TESTS MAY BE REQUIRED IN ACCORDANCE WITH
N.J.A.C. 7:27-8.4(c).

IF WE DO NOT INSPECT THIS EQUIPMENT DURING THIS 90 DAY PERIOD, THIS
TEMPORARY CERTIFICATE WILL BE EXTENDED. YOU NEED NOT APPLY FOR SUCH AN
EXTENSION.

THIS DOCUMENT MUST BE READILY AVAILABLE FOR INSPECTION AT THE PLANT.

RECEIVED

APR 22 1985

N.J. STATE DEPT. OF ENVIRONMENTAL PROTECTION
DIVISION OF ENVIRONMENTAL QUALITY

N.J. Department of Environmental Protection
Division of Environmental Quality

CN-027

Trenton, New Jersey 08625

Approved by:

Supervisor

New Source Review Specialist

PI AIT-CERTIFICATE REVIEW FORM

Cumberland

A. FEE 40 TRANSACTION NUMBER 060007 DATE LOGGED _____ LOG NO. 850451B. PLANT/STACK ID NUMBER 75203-001 CANCEL P/CT _____ LEGAL ACTION NoneC. COMPANY Precision Plastics Products Co. (Vineland)
COMPANY DESIGNATION OF EQUIPMENT Chromium plating tank, diffuse and to
CONTROL APPARATUS "Mist Lumber"

EMISSIONS	MW	VP	PPM		WITHOUT CON.		WITH CON.		EFF %	ALLOWABLE <u>lb/h</u>	NJAC 7:27-
			OTL	ACT	lb./h	T/y	lb./h	T/y			
<u>H₂SO₄</u>					<u>.03</u>	<u>.021</u>	<u>.002</u>	<u>.0021</u>	<u>90</u>	<u>0.5</u>	<u>6-2, 5, 2, 5, 2</u>
<u>H₂CrO₄</u>					<u>.08</u>	<u>.054</u>	<u>.008</u>	<u>.0054</u>	<u>"</u>	<u>0.5</u>	

ADDITIONAL STATEMENTS _____

D. EVALUATOR (Signature) DATE MAR 1 1985 TIME UNITS 15☒ APPROVE☐ DISAPPROVE DUE TO:

- ☐
- INSUFFICIENT INFORMATION
-
- ☐
- NOT STATE OF THE ART
-
- ☐
- EQUIPMENT VIOLATES _____

RECEIVED

APR 17 1985

STACK TEST FOR _____

E. ADDITIONAL REGULATIONS

☐ EOP☐ NESHAPS☐ CARCINOGEN☐ MODELLING☐ PSD☐ EPA AUDIT☐ PINELAND☐ NSPS

F. PRE-SCREEN

RECOMMENDATION TEMPGROUP LEADER MPSDATE 3-14-85☒ CONCUR☐ ADDITIONS _____G. SUPERVISOR (Signature)DATE MAR 21 1985☒ APPROVE☐ DISAPPROVE

P/CT START-UP _____

DURATION 90LETTER NUMBER 01

NEW JERSEY STATE DEPARTMENT



OF ENVIRONMENTAL PROTECTION

BUREAU OF AIR POLLUTION CONTROL

APPLICATION FOR
PERMIT TO CONSTRUCT, INSTALL OR ALTER CONTROL APPARATUS OR EQUIPMENT
AND
CERTIFICATE TO OPERATE CONTROL APPARATUS OR EQUIPMENT

TO: New Jersey Department of Environmental Protection
Bureau of Air Pollution Control
CN-027, Trenton, NJ 08625

Read Instructions Before Completing Application

SECTION A	1. Full Business Name	<u>Precision Plastic Molding Company</u>			
	2. Mailing Address	<u>1844 Southampton Rd.</u>	<u>Northampton</u>	<u>MA</u>	<u>01060</u>
	3. Division and/or Plant Name	<u>Precision Plastic Molding Co.</u>			
	4. Plant Location	<u>1844 Southampton Rd.</u>	<u>Northampton</u>	<u>MA</u>	<u>01060</u>
	5. Location of Equipment on Premises (bldg., dept., area, etc.)	<u>Dept #2</u>			
	6. Nature of Business	<u>Plastic Molding</u>			
	7. Estimated Starting Date of Construction	<u>JANUARY 28, 1985</u>			
	8. Date Equipment to be put in use	<u>MARCH 12, 1985</u>			
	9. Plant Contact	<u>Scott Gibson</u>	<u>Owner</u>	<u>609-691-5501</u>	
SECTION B	REASON FOR APPLICATION (Check One)				
	<input type="checkbox"/> New Equipment without Control Apparatus <input checked="" type="checkbox"/> New Equipment with Control Apparatus <input type="checkbox"/> New Control Apparatus on Existing Equipment <input type="checkbox"/> Five Year Renewal of Certificate No. (s) <input type="checkbox"/> Other (Explain) _____				
SECTION C	STACK INFORMATION (EQUIVALENT STACK INFORMATION)				
	1. Company Designation of Stack (s) <u>VENT NUMBER ONE (AID BATHS)</u>				
	2. Previous Certificate Numbers (if any) _____				
	3. a. Number of Sources Venting to this Stack <u>2</u> (Complete a separate VEM-004 for each source)				
	b. Number of Stacks Venting Source Operation (s) <u>1</u>				
	4. Distance to the nearest Property Line (ft.) <u>50'</u>				
	5. Stack Diameter (inches) <u>10"</u>				
	6. Discharge Height Above Ground (ft.) <u>12'</u>				
	7. Exit Temperature of Stack Gases (°F) <u>75°F</u>				
8. Volume of Gas Discharged at Stack Conditions (A.C.F.M.) <u>2500 CFM</u>					
9. Discharge Directions <input checked="" type="checkbox"/> Horizontal <input type="checkbox"/> Up <input type="checkbox"/> Down					

The information supplied on applications VEM-003 and VEM-004, including the data in supplements, is to the best of my knowledge true and correct.

Scott Gibson
Signature
Scott Gibson
Name (print or type)

2-15-85
Date
President
Title

This application will not be processed unless proper fee is submitted.

FOR ASSISTANCE CALL (609) 292-6716

FOR DEPARTMENT USE ONLY

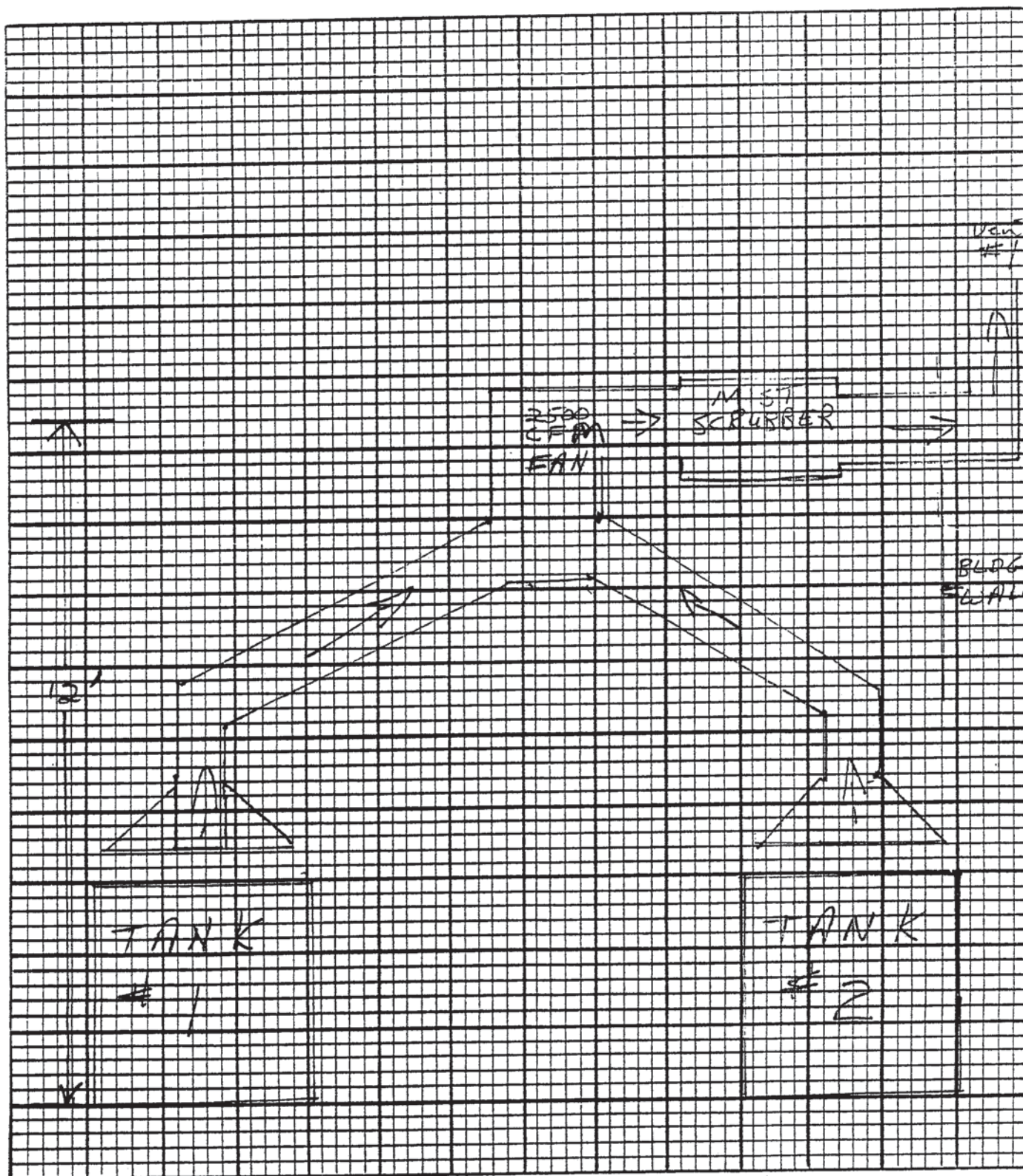
N.J.I.D. STACK LOG NO. CT. NO.
 [] [] [] [] - [] [] [] [] - 0000 85-0451 [] [] [] []

FEE \$40 OK
EVAL. HD

William Stephens
N.S.R. 2-19-85
060007

SECTION D DIAGRAM INSTRUCTIONS - A diagram must be included showing the configuration of all stacks, control apparatus and sources related to this application. NOTE: In cases of multiple stacks, include the following information for each stack: (1) distance to nearest property line, (2) stack diameters, (3) stack height above ground, (4) exit temperature ($^{\circ}$ F) of stack gases, (5) volume rate of gases (ACFM) discharged at stack conditions, (6) the location and type of control apparatus, (7) direction of flows, and (8) maximum stack emissions.

Diagram



NEW JERSEY STATE DEPARTMENT



OF ENVIRONMENTAL PROTECTION

BUREAU OF AIR POLLUTION CONTROL

APPLICATION FOR
PERMIT TO CONSTRUCT, INSTALL OR ALTER CONTROL APPARATUS OR EQUIPMENT
AND
CERTIFICATE TO OPERATE CONTROL APPARATUS OR EQUIPMENTSource Emissions And Source Data Form
(Complete this form for each source and submit
with application Form VEM-003)

SECTION E	SOURCE INFORMATION			
	1. Source Description <u>Chromium Plating Tank</u> <u>30901001</u>			
	2. Operating Schedule <u>8</u> <u>2087</u> <u>February 18, 1975</u> Hours/Day Hours/Year Operation Starting Date			
	3. % Annual Production Throughput <u>25%</u> <u>25%</u> <u>25%</u> <u>25%</u> By Quarter Jan.-Mar. Apr.-June July-Sept. Oct.-Dec.			
SECTION F	4. Volume Of Gas Discharged From This Source (ACFM) <u>2,500 CFM</u> Source Discharge Temperature ($^{\circ}$ F) <u>75$^{\circ}$F</u>			
	CONTROL APPARATUS ON SOURCE			
	Primary <u>Mist Scrubber</u>	Capital Cost (Dollars) <u>\$6,000.00</u>	Annual Operating Cost (Dollars) <u>\$500.00</u>	No. of Sources Connected <u>2</u>
	Secondary _____	_____	_____	_____
SECTION G	AIR CONTAMINANTS FROM SOURCE			
	CONTAMINANT NAME	Emissions w/o Control (lbs./hr.)	Emissions with Control (lbs./hr.)	How Determined
	<u>Chromic Acid H_2CrO_4</u>	<u>0.08</u>	<u>0.008</u>	<u>4</u>
	<u>cc 223.3</u>	_____	_____	_____
	_____	_____	_____	_____
	_____	_____	_____	_____
	_____	_____	_____	_____
	_____	_____	_____	_____
	_____	_____	_____	_____
	_____	_____	_____	_____

TO INSURE PROPER COORDINATION BETWEEN VEM- 003 AND VEM- 004 FORMS, INSERT IDENTICAL COMPANY NAME AND DESIGNATION OF STACK FROM VEM- 003, SIDE 1.

Full Business Name Precision Plastic Models Company
Company Designation of Stack (s) Vent # 1

(over)

A. MANUFACTURING AND MATERIALS HANDLING

1. Process Description Chromium Plating with Sulfuric Acid Dip ²⁴2. Total Amount ☒ Batch 30 lb./batch, 1.5 hr./batchMaterials Processed ☐ Continuous _____ lb/hr

3. Raw Materials _____ % By Wt.

Chromium Trioxide 33.1%Metal 1978.5 99

Raw Materials

% By Wt.

B. FUEL BURNING EQUIPMENT

1. Gross Heat Input (10^6 BTU/HR) N/A2. Type Heat Exchange ☐ Direct ☐ Indirect

PRIMARY FUEL

SECONDARY FUEL

3. a. Type of Fuel: _____

b. Heating Value (Btu/lb): _____

4. Method of Firing: _____

5. % Sulfur in Fuel (Dry): _____

6. % Ash Content of Fuel (Dry): _____

7. Amount Burned/Yr. _____

Units: Solid Fuel (Tons)

Liquid Fuel (10^3 Gal.)Gaseous Fuel (10^3 ft.³)

C. INCINERATION

1. Type of Unit N/A

2. Constituents of Waste (s) _____

3. Waste Code ☐ 0 ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6

4. Amount Burned (lbs./hr.) _____ Type of Auxil. Fuel (If Any) _____

D. STORAGE FACILITY

1. Tank Contents N/A

2. Type of Tank or Bin _____ Height or Length (Ft.) _____

3. Capacity _____ (10^3 Ft.³) ☐ Equivalent or Actual Diameter (Ft.) _____
(10^3 Gal.) ☐

THE REMAINING QUESTIONS ARE TO BE ANSWERED ONLY FOR LIQUID STORAGE

4. Vapor Pressure at 70°F (PSIA) _____ Storage Temp. If Not Ambient (°F) _____

5. Filling Rate (Gal/Min) _____ Annual Throughput (10^3 Gal/Yr) _____6. Method of Fill ☐ Top ☐ Bottom ☐ Submerged ☐ Other (Explain Below)7. Color of Tank ☐ White ☐ Other Exposed to Sun's Rays ☐ Yes ☐ No

8. Insulation Data for Insulated Tanks (Volatile Organic Substances)

Type _____, Thickness (Inches) _____, Thermal Conductivity (BTU·HR/FT²·°F) _____

For Department Use Only

--	--	--	--	--	--	--	--	--	--	--	--	--

NEW JERSEY STATE DEPARTMENT



OF ENVIRONMENTAL PROTECTION

BUREAU OF AIR POLLUTION CONTROL

APPLICATION FOR
PERMIT TO CONSTRUCT, INSTALL OR ALTER CONTROL APPARATUS OR EQUIPMENT
AND
CERTIFICATE TO OPERATE CONTROL APPARATUS OR EQUIPMENTSource Emissions And Source Data Form
(Complete this form for each source and submit
with application Form VEM-003)

SECTION E	SOURCE INFORMATION			
	1. Source Description <u>Sulfuric Acid Wash Tower, 25% solution</u> <u>30901102</u>			
	2. Operating Schedule <u>8</u> <u>2088</u> <u>February 18, 1985</u> Hours/Day Hours/Year Operation Starting Date			
	3. % Annual Production Throughput By Quarter <u>25%</u> <u>25%</u> <u>25%</u> <u>25%</u> Jan.-Mar. Apr.-June July-Sept. Oct.-Dec.			
	4. Volume Of Gas Discharged From This Source (ACFM) <u>2,500</u> Source Discharge Temperature (°F) <u>75°F</u>			
SECTION F	CONTROL APPARATUS ON SOURCE			
	Primary <u>Mist Scrubber</u>	Capital Cost (Dollars) <u>\$6,000.00</u>	Annual Operating Cost (Dollars) <u>\$500.00</u>	No. of Sources Connected <u>2</u>
	Secondary _____	_____	_____	_____
	Tertiary _____	_____	_____	_____
SECTION G	AIR CONTAMINANTS FROM SOURCE			
	CONTAMINANT NAME	Emissions w/o Control (lbs./hr.)	Emissions with Control (lbs./hr.)	How Determined
	<u>Sulfuric Acid H₂SO₄</u>	<u>0.02</u>	<u>0.002</u>	<u>4</u>
	<u>008769</u>	_____	_____	_____
	_____	_____	_____	_____
	_____	_____	_____	_____
	_____	_____	_____	_____
	_____	_____	_____	_____
	_____	_____	_____	_____
	_____	_____	_____	_____

TO INSURE PROPER COORDINATION BETWEEN VEM- 003 AND VEM- 004 FORMS, INSERT IDENTICAL COMPANY NAME AND DESIGNATION OF STACK FROM VEM- 003, SIDE 1.

Full Business Name Precision Plastic Moulds Company
Company Designation of Stack (s) Vent #1

(over)

A. MANUFACTURING AND MATERIALS HANDLING

1. Process Description Sulfuric Acid Dip Tank for METAL plating ²⁵
6012 rods

2. Total Amount ☒ Batch 20 lb/batch, 1.5 hr/batch
 Materials Processed ☐ Continuous _____ lb/hr

3. Raw Materials Sulfuric Acid 769 % By Wt. 1%
Metal 107805 99

Raw Materials _____ % By Wt. _____

B. FUEL BURNING EQUIPMENT

1. Gross Heat Input (10^6 BTU/HR) N/A

2. Type Heat Exchange ☐ Direct ☐ Indirect ☐ Internal Combust. in Engine
 PRIMARY FUEL _____ SECONDARY FUEL _____

3. a. Type of Fuel: _____
 b. Heating Value (BTU/lb): _____

4. Method of Firing: _____

5. % Sulfur in Fuel (Dry): _____

6. % Ash Content of Fuel (Dry): _____

7. Amount Burned/Yr. _____
 Units: Solid Fuel (Tons) _____ Liquid Fuel (10^3 Gal.) _____ Gaseous Fuel (10^6 Btu) _____

C. INCINERATION

1. Type of Unit N/A

2. Constituents of Waste (s) _____

3. Waste Code ☐ 0 ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6

4. Amount Burned (lbs./hr.) _____ Type of Auxil. Fuel (If Any) _____

D. STORAGE FACILITY

1. Tank Contents N/A

2. Type of Tank or Bin _____ Height or Length (Ft.) _____

3. Capacity _____ (10^3 Ft.³) ☐ Equivalent or Actual Diameter (Ft.) _____
 (10^3 Gal.) ☐

THE REMAINING QUESTIONS ARE TO BE ANSWERED ONLY FOR LIQUID STORAGE

4. Vapor Pressure at 70°F (PSIA) _____ Storage Temp. If Not Ambient (°F) _____

5. Filling Rate (Gal/Min) _____ Annual Throughput (10^3 Gal/Yr) _____

6. Method of Fill ☐ Top ☐ Bottom ☐ Submerged ☐ Other (Explain Below)

7. Color of Tank ☐ White ☐ Other Exposed to Sun's Rays ☐ Yes ☐ No

8. Insulation Data for Insulated Tanks (Volatile Organic Substances)
 Type _____, Thickness (Inches) _____, Thermal Conductivity (BTU/HR/FT²/°F) _____

For Department Use Only

□ □ □ □ □ - □ □ □ □ □ - □ □ □ □ □

SECTION H

COMPANY INFORMATION

PLANT ID #: 75203 INSPECTOR: MSCI: TYPE:

COMPANY NAME: LAWSON MARDON WHEATON INC. MONTH: 8
DIVISION NAME: VINELAND PLANT CYCLE: 5
LOCATION: 158 W WEYMOUTH RD
MUNICIPALITY: VINELAND LAST INSP: 9/18/95 UTMH: 497.7
UTMV: 4376.3

SRO STATUS: 5 Minor - Sub 21 N/A NSPS: NESHAPS: PSD:
APEDS CATEGORY: 3 Minor - Industrial

SIC: 3079 ***** WAVE: * SUB 22 DUE: *****

SAROAD MUNICIPAL CODE: 5560 MUNICIPALITY: VINELAND CITY
SAROAD COUNTY CODE: 1050 COUNTY NO.: 75 COUNTY: CUMBERLAND
CTY/MUN (COMU) CODE: 0614

PLANT ID: 75203 RETURNED: MSCI:

COMPANY NAME: LAWSON MARDON WHEATON INC.

DIVISION NAME: PRECISION PLASTIC MODEL

ADDRESS: 1101 WHEATON AVE

CITY: MILLVILLE STATE: NJ ZIP: 08332 PHONE: 609-825-1400

COMMENTS:

DEQ-062
9/89

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF ENVIRONMENTAL QUALITY
BUREAU OF ENFORCEMENT OPERATIONS

PLANT ID #	INSPECTOR ASSIGNED
75203	620

FIELD INVESTIGATION ASSIGNMENT REPORT

DATE ASSIGNED	DATE DUE
DATE COMPLETED	COUNTY
5-8-92	CUMB

COMPANY NAME Precision Plastic Models Company TYPE OF ASSIGNMENT CYCLE

LOCATION 158 W. Weymouth Rd
CDS CLASS : A1 A2 B NSPS NESHAPS PSD
AIR GRANT (105) : YES NO PLLT: PT S2 CO N2 VO TOXIC OTHER

COMPLAINANT NAME PHONE #

COMPLAINANT ADDRESS

DATE RECEIVED TIME RECEIVED COMPL. LOG RECORDED BY

ASSIGNMENT

PLANT CONTACT Scott Gibson
TITLE President
TIME AT PLANT 1500 TO 1600
(Military Time)
TOTAL ASSIGNMENT TIME OT 24 units
STACKS INSPECTED 2 TEMPS 1
OF SOURCES INSPECTED 3 STK TEST REQ N

SAMPLE TYPE	VIOLATIVE	SAMPLE #

SUBCHAPTER	# INSP	RPT Y/N
6	1	
8	1	
OTHER		

DEQ-012 COMPLETED FOR SUBCHAP.

COMPLAINT	TYPE	NUMBER
Time/Date at Complainant <u> </u>		
Verified : <u> </u> Yes <u> </u> No		
Sub 5 SOP followed: <u> </u> Yes <u> </u> No		
Give details below		
VIOLATION FOLLOWUP INSPECTION		
Violation Log # <u> </u>		
Order Dated <u> </u>		
Subchapter Violated <u> </u>		
Compliance Achieved <u> </u> Yes <u> </u> No		
Give details below		

COMMENTS (by code) 013

DETAILS OF INSPECTION Inspected facility for compliance with APC regulations. Company had a temporary Ct# 102571 to operate their plating tank. The tank was observed in operation and in compliance with its permit, (TTF). A BCI letter is not needed because the billable condition is already listed in the conditions. Also observed was a small paint booth w/ filters indirectly venting to the outside through a wall vent in a room above the booth. A permit application has already been forwarded to BWSR. Three small grinding operations each with own d/c were observed in use. Equipment does not vent outside. No other sources found.

TTF NJ # 001

F/U to ensure permit is obtained

SEE ATTACHED FOR ADDITIONAL INFORMATION: Yes No

INSPECTOR'S SIGNATURE

Vincent G. [Signature]

TITLE Senior Specialist
SUPERVISOR REVIEW
INITIALS DATE 5/28/92

PLANT ID #	INSPECTOR ASSIGNED
75203	620

FIELD INVESTIGATION ASSIGNMENT REPORT

DATE ASSIGNED	DATE DUE
9-11-95	10-15-95
DATE COMPLETED	COUNTY
9/18/95	75/Cum

COMPANY NAME Precision Plastic Models Company
LOCATION Vine Land

TYPE OF ASSIGNMENT

☐ Complaint ☐ APEDS
☐ Order Followup
☐ PRIORITY CODE 20

CDS CLASS: A1 ☐ A2 ☐ B ☐ NSPS ☐ NESHAPS ☐ PSD ☐ CMS ☐

AIR GRANT (105): ☐ Yes ☐ No PLT: PT ☐ S2 ☐ CO ☐ N2 ☐ VO ☐ Toxic ☐ Other ☐

COMPLAINANT NAME _____ PHONE # _____

COMPLAINANT ADDRESS _____

DATE RECEIVED _____ TIME RECEIVED _____ COMP. LOG _____ RECORDED BY _____

ASSIGNMENT _____

PLANT CONTACT Fred Hunt
TITLE Plant Manager
TIME AT PLANT (Military Time) 1430 TO 1515
TOTAL ASSIGNMENT TIME/OT 24 units
STACKS INSPECTED 1 TEMPS 0
OF SOURCES INSPECTED 1 STK TEST REQ N

SUBCHAPTER	# INSP	RPT Y/N
6	1	
8	1	
OTHER		

EFO-007(DEQ-012)Completed for Subchap.

COMPLAINT	TYPE	NUMBER
Time/Date at Complainant _____		
Verified: <input type="checkbox"/> Yes <input type="checkbox"/> No		
Sub 5 SOP followed: <input type="checkbox"/> Yes <input type="checkbox"/> No		
Give details below		
VIOLATION FOLLOWUP INSPECTION		
Violation Log # _____		
Order Dated _____		
Subchapter Violated _____		
Compliance Achieved <input type="checkbox"/> Yes <input type="checkbox"/> No		
Give details below		

SAMPLE TYPE	VIOLATIVE	SAMPLE #

COMMENTS (by code) 001 Billable Stacks: 1 (give details below)

DETAILS OF INSPECTION The chromium plating tank was inspected with no changes noted. The scrubber, located between the roof and drop ceiling, was observed in operation with packing in place. No visible emissions or odors noticed. The chrome tank is covered by NJM 001 p/cr#102571 and is subject to BCI fees. No other sources noted, in compliance with all codes.
A VEM-001 is forwarded to change the facility's mailing address to the same as location address.

NJM 001 subject to BCI fees, mailing address updated.

SEE ATTACHED FOR ADDITIONAL INFORMATION: ☐ YES ☐ NO

INSPECTOR'S SIGNATURE

Robert J. Anderson

TITLE: P.E.S.

SUPERVISOR'S REVIEW

INITIALS: ASD DATE: 9/20/95

10/4/95


LAWSON MARDON WHEATON

Certified Mail
Return Receipt Requested
P 093 539 585

LAWSON MARDON WHEATON INC.
1101 Wheaton Avenue
Millville, NJ 08332-2047, USA
Tel: 609 825 1400 - Fax: 609 327 8419

June 22, 1998

USEPA
Region 2
Director - Air & Waste Division
21st Floor
290 Broadway
New York, New York 10007-1866

Re: Lawson Mardon Wheaton Inc.
NJ APC #75203 c/t 102571
Area Source - at Non - Major Facility
[REDACTED]
With Composite Mesh Pad System
8.82 MM AMP Hrs.- Max Potential Rectifier Capacity

Dear Sir/Madam:


Enclosed is a copy of the performance testing at the above facility, demonstrating compliance with the MACT standard for our small hard chrome plating operation. The facility is a machine shop (SIC-3544) which fabricates, refurbishes, and restores molds (some of which require plating).

A O+M Plan, as required by the work practice standard is on file at the facility.

Based on the information contained in the attached, certified, testing report, I hereby certify that the existing affected, small, area source is in compliance with the applicable MACT standard.

Sincerely,

LAWSON MARDON WHEATON INC.

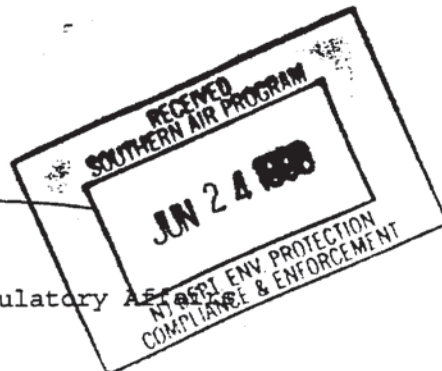


Robert E. Elegante
Director of Environmental & Regulatory Affairs



REE:ls

Enclosure



Project No. 2131

Lawson Mardon Wheaton, Inc.
Chrome Plating Operation
Emission Compliance Test Report

May 1998

R. E. Gleyant
6/23/98

1.0 Introduction

An emission compliance test program was conducted at the Lawson Mardon Wheaton, Inc. facility located in Vineland, New Jersey on May 26, 1998. Emission sampling was conducted to demonstrate the compliance status of a chrome plating operation and associated scrubber system with Federal EPA Maximum Achievable Control Technology (MACT) standards (40 CFR Part 63, Subpart N). The test program was conducted in determination of chromium emissions at the outlet of a wet scrubber control device.

This report contains a description of the emission source, a description of the testing methodologies utilized and a summary of the test results.

Questions and comments concerning this report may be directed to:

Mark D. Daly
AirNova, Inc.
5845 Clayton Avenue
Pennsauken, NJ 08109
(609) 486-1500

2.0 Source Information and Description

The source under evaluation as part of this program is a chrome plating process and associated scrubber system. The process applies a thin layer of chromium to small metal parts. An application rate of approximately 0.5 micron/min is utilized in applying the chrome under a current ranging from approximately 220 - 450 amps.

Emissions from the plating bath enter a Hexmaster Chromic Acid Gas scrubber system. The scrubber incorporates a three stage composite mesh pad system. The first and second stages consist of coalescing pads. The third stage is a mist eliminator consisting of 2-inch diameter polypropylene packing material. Gases exhaust from the scrubber at a rate of approximately 1500 scfm.

2.1 Emission Test Location

All emission sampling was conducted in a horizontal section of 10-inch diameter exhaust stack. The sample test ports were located at a 90° separation and were located 6.0 duct diameters downstream and 2.0 duct diameters upstream from the nearest flow disturbances. A standard pitot was located 2.0 duct diameters downstream from the sample ports and 2.0 duct diameters upstream from the nearest disturbance.

2.1.1 Sampling Point Locations

A total of sixteen (16) traverse points were utilized for all sampling. The traverse points were located as follows:

Table 2-1
Lawson Mardon Wheaton, Inc.
Sample Traverse Point Locations
Scrubber Exhaust Stack

Traverse Point	% Stack Diameter	Location (inches)
1	3.2	0.5*
2	10.5	1.1
3	19.4	1.9
4	32.3	3.2
5	37.7	6.8
6	80.6	8.1
7	89.5	9.0
8	96.8	11.5*

* Relocated in accordance with EPA Method 2.

3.0 Test Results Summary

The results of the test program are presented on the following page in Table 3-1. The average determined chromium emission rate was 0.022 mg/DSCM. The emission limit specified in 40 CFR, Part 63, Subpart N for small hard chromium electroplating facilities is 0.030 mg/DSCM.

Table 3-1
Lawson Mardon Wheaton, Inc.
Chromium Emission Test Program
Test Data Summary

Run No.	1	2	3	Average
Test Date	05/26/98	05/26/98	05/26/98	
Test Period	0925-1130	1220-1425	1447-1651	
Temperature (F)	79	80	81	80
Moisture Content (%)	1.8	2.3	1.8	2.0
Velocity (fps)	43.7	43.9	43.6	43.7
Flow Rate (ACFM)	1,428	1,436	1,425	1,430
Flow Rate (DSCFM)	1,359	1,354	1,352	1,355
Oxygen (%-dry)	20.90	20.90	20.90	20.90
Carbon Dioxide (%-dry)	0.00	0.00	0.00	0.00
Chromium Emissions				
Concentration (mg/DSCM)	0.024	0.025	0.018	0.022
Emission Rate (lb/hr)	1.2E-04	1.3E-04	8.9E-05	1.1E-04

0.0001

Standard Conditions: 68 deg. F, 29.92 in. Hg.

AFEDS DELETION

MEMO TO: AFEDS Section

DATE: 6/8/99

FROM: SOUTHERN REGIONAL OFFICE

PERF. CODE: 620

COMPANY: Lawson Mardon Wheaton, Inc.

PLANT ID #

LOCATION: 158 W. Weymouth Rd., Vireland

75203

PURPOSE: DELETE (Plant) / Stack / Source (Circle One)

STACK #	SOURCE #	CERT. #	G/F	REASON FOR DELETION
				All equipment was removed

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF ENVIRONMENTAL QUALITY
AIR POLLUTION ENFORCEMENT DATA SYSTEM

PLANT IDENTIFICATION INPUT FORM

KEY - TO BE DUPLICATED ON RECORD B

A
1

TRANSACTION CODE

D
2

N=NEW
U=UPDATE
D=DELETE
R=REACTIVATE

D.E.P. PLANT ID

75203
3 7

LEGAL NAME OF CORPORATION

TYPE OF OWNERSHIP

8 47

DIVISION AND/OR PLANT NAME

49 88

MAILING ADDRESS

89 113 114 128

STATE

ZIP CODE

129

131 135

PLANT LOCATION

CITY

136 160

161 175

(AREA CODE)

TELEPHONE NO.

SAROAD COUNTY

SAROAD MUNICIPALITY

SIC CODE

176

185

186 189

190 193

194 197

PLANT ELEVATION

UTM CO-ORD. HORIZ.

VERTICAL

198 201

202 205

206 210

SOURCE CATEGORY

SOURCE SIZE

OVERALL PLANT COMPLIANCE

INSPECTION MONTH

CYCLE

B
1

8

9

10

13

15

PLANT CONTACT

NESHAPS CODE

NSPS CODE

PSD

EOP

TVOS

16 30

31

32

33

34

35

DATE:

6/8/99

PREPARED BY:

Vincent / Barbora

PHONE NO.

609-757-2107

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF ENFORCEMENT FIELD OPERATIONS
AIR & ENVIRONMENTAL QUALITY ENFORCEMENT

PLANT ID #	INSPECTOR ASSIGNED
75203	V6 b20

FIELD INVESTIGATION ASSIGNMENT REPORT

DATE ASSIGNED	DATE DUE
6-8-99	6-15-99
DATE COMPLETED	COUNTY
6/8/99	CUMB.

TYPE OF ASSIGNMENT

☐ Complaint ☐ APEDS
☐ Order Followup

☒ PRIORITY CODE 44

CYCLE

COMPANY NAME LAWSON MARDON WHEATON

LOCATION PRECISION PLASTIC MODEL CO.

CDS CLASS: A1 ☐ A2 ☐ B ☐ NSPS ☐ NESHAPS ☐ PSD ☐ CMS ☐

AIR GRANT (105): ☐ Yes ☐ No PLT: PT ☐ S2 ☐ CO ☐ N2 ☐ VO ☐ Toxic ☐ Other ☐

COMPLAINT NAME

COMPLAINT ADDRESS

PHONE #

DATE RECEIVED TIME RECEIVED

COMP. LOG

RECORDED BY

ASSIGNMENT FAC REQUEST TO DELETE FAC (6-7-99)

PLANT CONTACT

TITLE

(Military Time) TO

TOTAL ASSIGNMENT TIME/OT 12

STACKS INSPECTED TEMPS

OF SOURCES INSPECTED STK TEST REQ

SAMPLE TYPE	VIOLATIVE	SAMPLE #

SUBCHAPTER	# INSP	RPT Y/N

EFO-007 (DEQ-012) Completed for Supchap.

COMPLAINT

TYPE NUMBER

Time/Date at Complainant

Verified: ☐ Yes ☐ No

Sub 5 SOP followed: ☐ Yes ☐ No

Give Details below

VIOLATION FOLLOWUP INSPECTION

Violation Log #

Order Dated

Subchapter Violated

Compliance Achieved ☐ Yes ☐ No

Give details below

Billable Stacks: (give details below)

COMMENTS (by code) 003

DETAILS OF INSPECTION Delete as per facility's request. The chrome plating operation was moved to the Millville Industrial Park and re-permitted there. CMW had sold this building to another company.

INSPECTOR'S SIGNATURE Shawn [Signature]

TITLE: PES

SUPERVISOR'S REVIEW

INITIALS: [Signature] DATE: 6/17/99

SEE ATTACHED FOR ADDITIONAL INFORMATION: ☐ YES ☐ NO

algroup wheaton

pharmaceutical and cosmetics packaging

June 7, 1999

Mr. Vincent Garbarino
NJ DEP
Air & Environmental Compliance & Enforcement
Southern Regional Office - One Port Center
2 Riverside Drive
Camden, NJ 08102

RECEIVED
DEP
1999 JUN - 8 A 11:50
AIR COMP & ENF.
SOUTHERN REG. OFFICE

Dear Mr. Garbarino:

This letter is to serve as a notice the following Wheaton USA Inc. facilities (formerly known as Lawson Mardon Wheaton) have ceased operations, and will need to have their Air Permits deactivated. The facilities in question are:

~~Lawson Mardon Wheaton - Science Plastics~~

~~P.O. Box 186~~

~~Tuckahoe, NJ 08250~~

~~Previous Facility Air Permit Number: 65116~~

Lawson Mardon Wheaton - General Machinery Company

1201 N. 10th Street

Millville, NJ 08332

Previous Facility Air Permit Number: 75140

Lawson Mardon Wheaton - Precision Plastic Model Company

158 W. Weymouth Road

Vineland, NJ 08360

Previous Facility Air Permit Number: 75203

Thank you for your prompt attention to this matter. If you have any questions about this letter, please feel free to contact me.

Very truly yours,

Tiffany Sollog

Tiffany Sollog
Chemical Materials Manager

Wheaton USA Inc.

SHE Department t + 609-825-0400 x 2223

1101 Wheaton Ave, MS #76 f + 609-327-8419

Millville, NJ 08332 tiffany.sollog@wheaton.com

ATTACHMENT 6b

*New Jersey Department of Environmental Protection, OPRA online information for the new
Wheaton site at 30 Gorton Road, Millville, NJ.*

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New Permits
of
New Site
Location30 Gorton
Rd.**Subject Item Inventory for Effective Air Permits**

Run At: 03/30/2010 11:30 am

Program Interest Number: 75480

Activity Class	Activity Number	Activity Type	Activity Status	Subject Item NJID	Facility Designation	Facility Description
PCP	000001	Construction of New Source	Renewed	CD 000600	Plater	Composite Mesh Pad Scrubber
PCP	000001	Construction of New Source	Renewed	E 000600	Plater	Chromium Electroplating Operation
PCP	000001	Construction of New Source	Renewed	PT 000600		Chromium Electroplating Operation Stack
PCP	000001	Construction of New Source	Renewed	U 000600 OS1	Plater	Chromium Electroplating Operation
PCP	990001	Construction of New Source	Renewed	CD 000200	SPRAY BOOTH	PAINT SPRAY BOOTH
PCP	990001	Construction of New Source	Renewed	E 000200	PAINT BOOTH	PAINT SPRAY BOOTH
PCP	990001	Construction of New Source	Renewed	PT 000200		PAINT SPRAY BOOTH
PCP	990001	Construction of New Source	Renewed	U 000200 OS200	SPRAY BOOTH	PAINT SPRAY BOOTH

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Last Updated: December 13, 2005

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Site ID
18293

[18293
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[18293
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[18293
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[1 to 5 of 5]

Program

Air

<u>PI ID</u> ▲	<u>NAME</u> ▲	<u>ACTIVE</u> ▲	<u>ADDRESS</u>		<u>TYPE</u> ▲	<u>REPORTS</u>
			<u>[street name]</u> ▲	<u>[municipality]</u> ▲		
			<u>[zip]</u> ▲			
75480	BIG 3 PRECISION PRODUCTS INC	Y	30 GORTON RD, Millville, NJ 08332	AIR		Air Permit SI  
Hazardous Waste						
NJR000028266	BIG 3 PRECISION MOLD SERVICES	Y	30 GORTON RD, Millville, NJ 08332	HW GENERATOR		Enf. Actions by PI  
Right-to-Know						
00000036553	BIG 3 PRECISION MOLD SERVICES LLC	Y	30 GORTON RD, Millville, NJ 08332	POLLUTION PREVENTION/RIGHT TO KNOW		Enf. Actions by PI  
89773600001	LAWSON MARDON WHEATON INC	N	30 GORTON RD, Millville, NJ 08332	POLLUTION PREVENTION/RIGHT TO KNOW		Enf. Actions by PI  
Site Remediation						
203740	MILLVILLE MOLD & MACHINERY SERVICES	Y	30 GORTON RD, Millville, NJ 08332	SRP-PI		Enf. Actions by PI  

<1>

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Last Updated: August 28, 2003

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Inspections Completed at the BIG 3 PRECISION PRODUCTS INC Site - ID Number: 18293 Between 12/30/1999 and 3/30/2010

Mar 30, 2010 11:32










NOTE: The information contained in this report will be limited to the date each program began using the Department's integrated database, NJEMS. The programs began using the system for this information as follows: Air - 10/1998; Hazardous Waste - 1/2000; Water Quality - 7/2000; Water Supply (limited information for Safe Drinking Water and Water Allocation) - 7/2000; Lab Certification (limited information) - 7/2000; TCPA - 12/2001; Land Use 12/2001; DPCC - 1/2002; Solid Waste - 1/2002; Right To Know - 3/2002 and Pesticides - 4/2002; Site Remediation - 3/2003 and Radiation (limited information) - 7/2006. For complete information prior to these dates, please submit an official OPRA request form to the Department. If printing this report, select landscape orientation. For a list of terms and definitions, click on the following link: <http://www.state.nj.us/dep/infview/enforcement.html>

Disclaimer: Only final inspection reports are listed in this report. Inspections for which a report has not been finalized by the Department will not appear in this report. Also, inspections which yield violations but where the inspected entity has not yet been notified of the violation are not listed in this report. For inspections indicating Violations Found, this means that one or more alleged violations were observed during the inspection, based on facts and information known to the Department at the time of the inspection. Errors or omissions in the factual basis for any violation may result in a future change in classification as a violation when such information becomes known.

Program Description: Air

Program Interest Name: BIG 3 PRECISION PRODUCTS INC




Program Interest ID #: 75480

Activity Number	Inspection Type	Start Date of Inspection	Finalized Date	Inspection Results	Inspection Details	Related Enf Actions	Related Violations
NEA 020001	Administrative Consent Order (ACO)	10/14/2003	10/16/2003	No Violations Found	 Inspection Summary	 Enforcement Actions	 Violations
PEA 010001	AONOCAPA	10/14/2003	10/16/2003	No Violations Found	 Inspection Summary	 Enforcement Actions	 Violations
SCI 010001	*Standard Compliance Inspection	6/25/2001	8/2/2001	Violations Found	 Inspection Summary	 Enforcement Actions	 Violations

Program Description: Hazardous Waste

Program Interest Name: BIG 3 PRECISION MOLD SERVICES

Program Interest ID #: NJR000028266

Activity Number	Inspection Type	Start Date of Inspection	Finalized Date	Inspection Results	Inspection Details	Related Enf Actions	Related Violations
SCI 060001	*Standard Compliance Inspection	8/8/2006	8/18/2006	No Violations Found	 Inspection Summary	 Enforcement Actions	 Violations

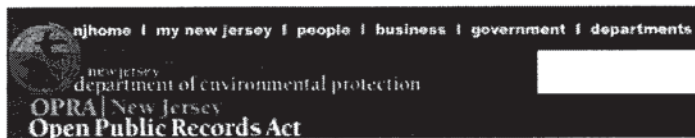
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Last Updated: December 13, 2005



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Inspection Summary Report for BIG 3 PRECISION PRODUCTS INC - Activity Number NEA 020001

Mar 30, 2010 11:33

NOTE: The information contained in this report will be limited to the date each program began using the Department's integrated database, NJEMS. The programs began using the system for this information as follows: Air - 10/1998; Hazardous Waste - 1/2000; Water Quality - 7/2000; Water Supply (limited information for Safe Drinking Water and Water Allocation) - 7/2000; Lab Certification (limited information) - 7/2000; TCPA - 12/2001; Land Use 12/2001; DPCC - 1/2002; Solid Waste - 1/2002; Right To Know - 3/2002 and Pesticides - 4/2002; Site Remediation - 3/2003 and Radiation (limited information) - 7/2006. For complete information prior to these dates, please submit an official OPRA request form to the Department. If printing this report, select landscape orientation. For a list of terms and definitions, click on the following link: <http://www.state.nj.us/dep/infview/enforcement.html>

Disclaimer: Only final inspection reports are listed in this report. Inspections for which a report has not been finalized by the Department will not appear in this report. Also, inspections which yield violations but where the inspected entity has not yet been notified of the violation are not listed in this report. For inspections indicating Out of Compliance, this means that violations were observed during the inspection, based on facts and information known to the Department at the time of the inspection. Errors or omissions in the factual basis for any violation may result in a future change in classification as a violation when such information becomes known.

Activity Number: NEA 020001 Inspection Type: Administrative Consent Order (ACO) Program Interest ID: 75480

Inspection Start Date: 10/14/03 End Date: 10/14/03 Lead Investigator: Pressley, Shanya

Program Interest Name: BIG 3 PRECISION PRODUCTS INC

Address: 30 GORTON RD Millville NJ 08332 County: Cumberland - Millville City

Block: Lot:

Comments:

Follow-Up to NEA020001

Subject Item: AV01 0 - Air Violation

Requirement Description	Compliance Status	Compliance Comments	Grace Days	Non Minor Reason	Requirement Source
None.	In Compliance	PermitCertificate # PCP000001 was approved on June 18, 2002. Facility is now demonstrating compliance.			NEA 020001

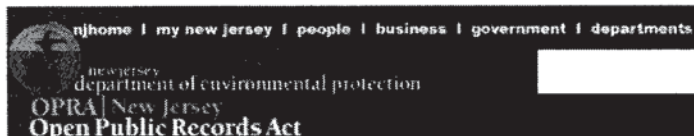
Subject Item: AV02 0 - Air Violation

Requirement Description	Compliance Status	Compliance Comments	Grace Days	Non Minor Reason	Requirement Source
None.	In Compliance	PermitCertificate # PCP000001 was approved on June 18, 2002. Facility is now demonstrating compliance.			NEA 020001

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Last Updated: December 13, 2005



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Inspection Summary Report for BIG 3 PRECISION PRODUCTS INC - Activity Number PEA 010001

Mar 30, 2010 11:33

NOTE: The information contained in this report will be limited to the date each program began using the Department's integrated database, NJEMS. The programs began using the system for this information as follows: Air - 10/1998; Hazardous Waste - 1/2000; Water Quality - 7/2000; Water Supply (limited information for Safe Drinking Water and Water Allocation) - 7/2000; Lab Certification (limited information) - 7/2000; TCPA - 12/2001; Land Use 12/2001; DPCC - 1/2002; Solid Waste - 1/2002; Right To Know - 3/2002 and Pesticides - 4/2002; Site Remediation - 3/2003 and Radiation (limited information) - 7/2006. For complete information prior to these dates, please submit an official OPRA request form to the Department. If printing this report, select landscape orientation. For a list of terms and definitions, click on the following link: <http://www.state.nj.us/dep/infview/enforcement.html>

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Activity Number: PEA 010001 Inspection Type: AONOCAPA Program Interest ID: 75480

Inspection Start Date: 10/14/03 End Date: 10/14/03 Lead Investigator: Pressley, Shanya

Program Interest Name: BIG 3 PRECISION PRODUCTS INC

Address: 30 GORTON RD Millville NJ 08332 County: Cumberland - Millville City

Block: Lot:

Comments:

Follow-Up to PEA010001

Subject Item: AV01 0 - Air Violation

Requirement Description	Compliance Status	Compliance Comments	Grace Days	Non Minor Reason	Requirement Source
Obtain an approved permit: Within 90 days of receipt of this document. [N.J.A.C. 7:27- 8.3(a)]	In Compliance	PermitCertificate # PCP000001 was approved on June 18, 2002. Facility is now demonstrating compliance.			PEA 010001

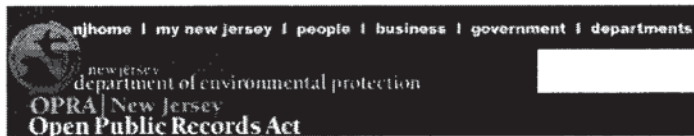
Subject Item: AV02 0 - Air Violation

Requirement Description	Compliance Status	Compliance Comments	Grace Days	Non Minor Reason	Requirement Source
Obtain an approved permit: Within 90 days of receipt of this document. [N.J.A.C. 7:27- 8.3(b)]	In Compliance	PermitCertificate # PCP000001 was approved on June 18, 2002. Facility is now demonstrating compliance.			PEA 010001

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Inspection Summary Report for BIG 3 PRECISION PRODUCTS INC - Activity Number SCI 010001

Mar 30, 2010 11:33

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Activity Number: **SCI 010001** Inspection Type: ***Standard Compliance Inspection** Program Interest ID: **75480**

Inspection Start Date: **06/25/01** End Date: **06/25/01** Lead Investigator: **Pressley, Shanya**

Program Interest Name: **BIG 3 PRECISION PRODUCTS INC**

Address: **30 GORTON RD** **Millville** **NJ 08332** County: **Cumberland - Millville City**

Block: Lot:

Comments:

FY '01 Minor Facility Inspection

Subject Item: **AFAR 0 - Air Federal Applicability Requirements**

Requirement Description	Compliance Status	Compliance Comments	Grace Days	Non Minor Reason	Requirement Source
Determine MACT Applicability	In Compliance	Facility is classified as a "small, hard chromium electroplating facility" and is therefore required to install and operate a packed-bed scrubber for fume emission control on the electroplating operation. Facility has complied with this requirement by installing a totally recirculating (closed-loop) operation which emissions being directly vented to a scrubber.			Rules
Determine NESHAPS Applicability	In Compliance	see MACT applicability			Rules
Determine NSPS Applicability	Not Applicable				Rules
Determine PSD Applicability	Not Applicable				Rules

Subject Item: **AV01 0 - Air Violation**

Compliance	Grace	Non Minor	Requirement
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Requirement Description	Status	Compliance Comments	Days	Reason	Source
No person may construct, reconstruct, install, or modify a significant source that is not covered by a permit and certificate without first obtaining a preconstruction permit. [N.J.A.C. 7:27- 8.3(a)]	Out of Compliance	In January 1999, you installed a hard chromium electroplating operation without first obtaining a preconstruction permit. The electroplating operation is composed of the following equipment: - one 400-gallon tank directly vented to the scrubber contains acid chrome flake-chromic acid, water, sulfuric acid, and barium chloride; - three 50-gallon tanks contain rinse water; - one 40-gallon tank contains caustic soda (2%) and water (98%); and - one 15-gallon tank contains sulfuric acid (21%), muriatic acid (1%), and water (79%).		Undermines Reg. Goals	Rules

Subject AV02 0 - Air Violation
Item:

Requirement Description	Compliance Status	Compliance Comments	Grace Days	Non Minor Reason	Requirement Source
No person shall operate (nor cause to be operated) a significant source without a valid operating certificate. [N.J.A.C. 7:27- 8.3(b)]	Out of Compliance	In January 1999, you operated a hard chromium electroplating operation without first having obtained a valid operating certificate. The electroplating operation is composed of the following equipment: - one 400-gallon tank directly vented to the scrubber contains acid chrome flake-chromic acid, water, sulfuric acid, and barium chloride; - three 50-gallon tanks contain rinse water; - one 40-gallon tank contains caustic soda (2%) and water (98%); and - one 15-gallon tank contains sulfuric acid (21%), muriatic acid (1%), and water (79%).		Undermines Reg. Goals	Rules

Subject U 200 - SPRAY PAINT BOOTH
Item:

Requirement Description	Compliance Status	Compliance Comments	Grace Days	Non Minor Reason	Requirement Source
Maximum No. of Billable Compliance Inspections <= 2 inspections. The equipment covered by this permit will be subject to inspection fees for the maximum periodic compliance inspections (as defined in N.J.A.C. 7:27-8.1) over the life of the Certificate, after it receives final approval for a five year duration. The permittee will be invoiced for a \$200 service fee per inspection pursuant to N.J.A.C. 7:27-8.11 after the periodic compliance inspection is conducted. [N.J.A.C. 7:27- 8.13(e)]	In Compliance	Facility will be billed for the inspection of this source operation.			PCP 990001
Particulate Emissions <= 0.0014 tons/yr. [N.J.A.C. 7:27- 8]	In Compliance	Facility records for CY '00 indicate PM emissions = 0.00045 tons/yr. SEE ATTACHMENTS			PCP 990001
Particulate Emissions <= 0.003 lb/hr. [N.J.A.C. 7:27- 8]	In Compliance	Facility records for CY '00 indicate PM emissions = 0.002 lb/hr. SEE ATTACHMENTS			PCP 990001
Particulate Emissions: Monitored by calculations annually, based on no averaging period. [N.J.A.C. 7:27- 8]	In Compliance	Facility is complying with recordkeeping requirement.			PCP 990001
Particulate Emissions: Monitored by calculations once initially, based on any 60 minute period. [N.J.A.C. 7:27- 8]	In Compliance	Facility is complying with recordkeeping requirement.			PCP 990001
Particulate Emissions: Recordkeeping by manual logging of parameter annually. [N.J.A.C. 7:27- 8]	In Compliance	Facility is complying with recordkeeping requirement.			PCP 990001
Particulate Emissions: Recordkeeping by manual logging of parameter once initially. [N.J.A.C. 7:27- 8]	In Compliance	Facility is complying with recordkeeping requirement.			PCP 990001
VOC (Total) <= 0.85 tons/yr. [N.J.A.C. 7:27- 8]	In Compliance	Facility records for CY '00 indicate VOC emissions = 0.403 tons/yr. SEE ATTACHMENTS			PCP 990001
VOC (Total) <= 1.69 lb/hr. [N.J.A.C. 7:27- 8]	In Compliance	Facility records for CY '00 indicate VOC emissions = 1.44 lb/hr. SEE ATTACHMENTS			PCP 990001
VOC (Total): Monitored by calculations annually, based on no averaging period. [N.J.A.C. 7:27- 8]	In Compliance	Facility is complying with recordkeeping requirement.			PCP 990001
VOC (Total): Monitored by calculations once initially, based on any 60 minute period. [N.J.A.C. 7:27- 8]	In Compliance	Facility is complying with recordkeeping requirement.			PCP 990001

VOC (Total): Recordkeeping by manual logging of parameter annually. [N.J.A.C. 7:27- 8]	In Compliance	Facility is complying with recordkeeping requirement.			PCP 990001
VOC (Total): Recordkeeping by manual logging of parameter once initially. [N.J.A.C. 7:27- 9]	In Compliance	Facility is complying with recordkeeping requirement.			PCP 990001

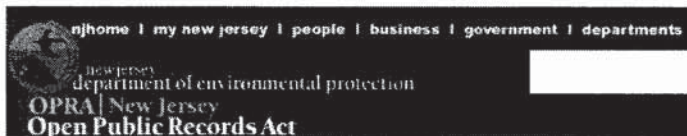
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Enforcement Actions Issued To BIG 3 PRECISION PRODUCTS INC -
Program Interest ID: 75480 and Discovery Activity
Number: SCI 010001 Program: Air

Mar 30, 2010 11:36

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Activity Number: NEA 020001

Document Type: Administrative Consent Order (ACO)

Effective Start Date	Current Document Status and Date	Penalty Assessed	Amount Received
1/2/2003	Closed 10/16/2003	\$3,200.00	\$3,200.00





Description of Non-compliance	Violated Citation	Violation Status	Related Inspection	Related Violations
<p>In January 1999, you installed a hard chromium electroplating operation without first obtaining a preconstruction permit.</p> <p>The electroplating operation is composed of the following equipment:</p> <ul style="list-style-type: none"> - one 400-gallon tank directly vented to the scrubber contains acid chrome flake-chromic acid, water, sulfuric acid, and barium chloride; - three 50-gallon tanks contain rinse water; - one 40-gallon tank contains caustic soda (2%) and water (98%); and - one 15-gallon tank contains sulfuric acid (21%), muriatic acid (1%), and water (79%). 	[N.J.A.C. 7:27- 8.3(a)]	Satisfied	Inspection	Violations
<p>In January 1999, you operated a hard chromium electroplating operation without first having obtained a valid operating certificate.</p> <p>The electroplating operation is composed of the following equipment:</p> <ul style="list-style-type: none"> - one 400-gallon tank directly vented to the scrubber contains acid chrome flake-chromic acid, water, sulfuric acid, and barium chloride; - three 50-gallon tanks contain rinse water; - one 40-gallon tank contains caustic soda (2%) and water (98%); and - one 15-gallon tank contains sulfuric acid (21%), muriatic acid (1%), and water (79%). 	[N.J.A.C. 7:27- 8.3(b)]	Satisfied	Inspection	Violations

Activity Number: PEA 010001

Document Type: AONOCAPA

Effective Start Date	Current Document Status and Date	Penalty Assessed	Amount Received
9/5/2001	Closed 10/16/2003	\$4,000.00	\$0.00

			Related	Related
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Description of Non-compliance	Violated Citation	Violation Status	Inspection	Violations
<p>In January 1999, you installed a hard chromium electroplating operation without first obtaining a preconstruction permit.</p> <p>The electroplating operation is composed of the following equipment:</p> <ul style="list-style-type: none"> - one 400-gallon tank directly vented to the scrubber contains acid chrome flake-chromic acid, water, sulfuric acid, and barium chloride; - three 50-gallon tanks contain rinse water; - one 40-gallon tank contains caustic soda (2%) and water (98%); and - one 15-gallon tank contains sulfuric acid (21%), muriatic acid (1%), and water (79%). 	[N.J.A.C. 7:27- 8.3(a)]	Satisfied	 Inspection	 Violations
<p>In January 1999, you operated a hard chromium electroplating operation without first having obtained a valid operating certificate.</p> <p>The electroplating operation is composed of the following equipment:</p> <ul style="list-style-type: none"> - one 400-gallon tank directly vented to the scrubber contains acid chrome flake-chromic acid, water, sulfuric acid, and barium chloride; - three 50-gallon tanks contain rinse water; - one 40-gallon tank contains caustic soda (2%) and water (98%); and - one 15-gallon tank contains sulfuric acid (21%), muriatic acid (1%), and water (79%). 	[N.J.A.C. 7:27- 8.3(b)]	Satisfied	 Inspection	 Violations

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Inspection Summary Report for BIG 3 PRECISION MOLD SERVICES - Activity Number SCI 060001

Mar 30, 2010 11:38

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Activity Number: SCI 060001 Inspection Type: *Standard Compliance Inspection Program Interest ID: NJR000028266

Inspection Start Date: 08/08/06 End Date: 08/08/06 Lead Investigator: Salabritas, Jeffrey

Program Interest Name: BIG 3 PRECISION MOLD SERVICES

Address: 30 GORTON RD Millville NJ 08332 County: Cumberland - Millville City

Block: Lot:

Comments:

On August 8th 2006, I (Jeff Salabritas) conducted an inspection at Big 3 Precision Mold Services LLC, which is located at 30 Gorton Road in Millville. Big 3 Precision Mold Services has been in operation at this location for approximately three years. Lawson Marden Wheaton previously owned and operated a similar operation at this location. EPA Identification # NJR000028266 has been issued to this facility. Big 3 Precision Mold Services manufactures metal molds (steel and copper) for machines which make plastic bottles for pharmaceutical use and personal care products. Many of these molds are prepped (cleaned and etched) and chrome plated on-site. Big 3 Precision Mold Services utilizes the following tanks on-site: -50-gallon Caustic Soda dip tank -20-gallon Sulfuric Acid dip tank -300-gallon Chromate Tank. The contents of these tanks (including sludge's) have not been disposed of in recent history (since Big 3 Precision Mold Services began operating on-site). The facility has a 15-gallon parts washing unit which utilizes Safety-Kleen 105 Solvent (Petroleum Naphtha). Spent solvent (hazardous waste code-D001) is routinely shipped off-site to Safety-Kleen under a bill-of-lading. The facility has an air scrubbing unit (HexMaster) which is connected to the chromate dip tank; this unit is permitted by the NJDEP-Bureau of Air Permitting (PI #: 75480). No hazardous waste is currently being accumulated or stored on-site; Big 3 Precision Mold Services is currently operating as a CESQG at this location. No hazardous waste violations were observed.

Subject: ASCR 0 - Air Screening Checklist
 Item:

Requirement Description	Compliance Status	Compliance Comments	Grace Days	Non Minor Reason	Requirement Source
Dip tanks >100 gallons?.	Yes	300-gallon Chromate Dip Tank			Rules
Does the facility have any of the following:.	Yes				Rules
EMISSIONS.	No				Rules
If the equipment noted above was installed after 1973, do they have air pollution permits?.	Yes	The facility has an air scrubbing unit (HexMaster) which is connected to the chromate dip tank; this unit is permitted by the NJDEP-Bureau of Air Permitting (PI #: 75480).			Rules

Were any odors detected off facility property lines?.	No				Rules
Were visual emissions observed during this inspection (if yes, for how long in minutes)?.	No				Rules

Subject **HCQA** 0 - Conditionally Exempt Small Quantity Generator - Assigned
Item:

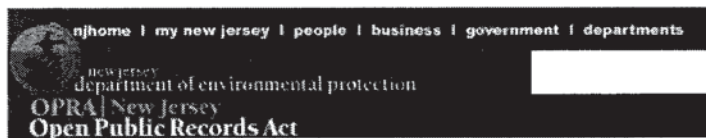
Requirement Description	Compliance Status	Compliance Comments	Grace Days	Non Minor Reason	Requirement Source
Conditionally Exempt Small Quantity Generator - Assigned	Heading				Rules

Subject **HCQG** 0 - Generator (CESQG) Checklist
Item:

Requirement Description	Compliance Status	Compliance Comments	Grace Days	Non Minor Reason	Requirement Source
*CONDITIONALLY EXEMPT SMALL QUANTITY GENERATOR REQUIREMENTS	Heading	The facility is currently operating as a CESQG.			Rules
Did the CESQG comply with the requirements of 261.5(f) for acute hazardous waste generated, so waste is excluded from full regulation?. [40 CFR 261.5(f)]	In Compliance				Rules
Did the CESQG comply with the requirements of 261.5(g) for hazardous waste generated, so waste is excluded from full regulation?. [40 CFR 261.5(g)]	Not Applicable				Rules
Did the CESQG generate acute hazardous waste in excess of quantities allowed and were quantities handled as being subject to full regulation?. [40 CFR 261.5(e)]	Not Applicable				Rules
Did the CESQG generate more than 100 kg of hazardous waste in a month?. [40 CFR 261.5(a)]	Not Applicable				Rules
Did the generator determine if its solid waste is hazardous?. [40 CFR 262.11]	In Compliance				Rules
Was CESQG hazardous waste mixed with non-hazardous waste and did the mixture meet any of the characteristics of hazardous waste identified in 261 Subpart C?. [40 CFR 261.5(h)]	Not Applicable				Rules
Was CESQG hazardous waste mixed with used oil and was resultant mixture handled in accordance with N.J.A.C. 7:26A-6 if it is destined to be burned for energy recovery?. [40 CFR 261.5(j)]	Not Applicable				Rules
Was hazardous waste that exceeds a quantity exclusion level mixed with a solid waste and was resultant mixture handled as being subject to full regulation?. [40 CFR 261.5(i)]	Not Applicable				Rules

Subject **HGNE** 0 - Used Oil Generator Checklist
Item:

Requirement Description	Compliance Status	Compliance Comments	Grace Days	Non Minor Reason	Requirement Source
Did the generator ensure that containers and aboveground tanks used to store used oil were in good condition and not leaking?. [N.J.A.C. 7:26A-6.4(d)3]	In Compliance				Rules
Did the generator have a permit to construct, install or alter control apparatus or equipment and certificate to to operate control apparatus or equipment or other required authorization prior to burning on-specification used oil in a space heater?. [N.J.A.C. 7:26A-6.4(e)4]	Not Applicable				Rules
Did the generator mark all units with the words "Used Oil"?. [N.J.A.C. 7:26A-6.4(d)4]	In Compliance				Rules
Did the generator store used oil in units regulated under N.J.A.C. 7:26G?. [N.J.A.C. 7:26A-6.4(d)2]	In Compliance				Rules
Did the generator, upon detection of a release: a. Stop the release. b. Contain the released used oil. c. Clean up and manage properly the released used oil and other	Not Applicable	No reported releases.			Rules



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Enforcement Actions Issued To BIG 3 PRECISION PRODUCTS INC -
Program Interest ID: 75480 and Discovery Activity
Number: SCI 010001 Program: Air

Mar 30, 2010 11:39

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Activity Number: NEA 020001

Document Type: Administrative Consent Order (ACO)

Effective Start Date	Current Document Status and Date	Penalty Assessed	Amount Received
1/2/2003	Closed 10/16/2003	\$3,200.00	\$3,200.00





Description of Non-compliance	Violated Citation	Violation Status	Related Inspection	Related Violations
<p>In January 1999, you installed a hard chromium electroplating operation without first obtaining a preconstruction permit.</p> <p>The electroplating operation is composed of the following equipment:</p> <ul style="list-style-type: none"> - one 400-gallon tank directly vented to the scrubber contains acid chrome flake-chromic acid, water, sulfuric acid, and barium chloride; - three 50-gallon tanks contain rinse water; - one 40-gallon tank contains caustic soda (2%) and water (98%); and - one 15-gallon tank contains sulfuric acid (21%), muriatic acid (1%), and water (79%). 	[N.J.A.C. 7:27- 8.3(a)]	Satisfied	Inspection	Violations
<p>In January 1999, you operated a hard chromium electroplating operation without first having obtained a valid operating certificate.</p> <p>The electroplating operation is composed of the following equipment:</p> <ul style="list-style-type: none"> - one 400-gallon tank directly vented to the scrubber contains acid chrome flake-chromic acid, water, sulfuric acid, and barium chloride; - three 50-gallon tanks contain rinse water; - one 40-gallon tank contains caustic soda (2%) and water (98%); and - one 15-gallon tank contains sulfuric acid (21%), muriatic acid (1%), and water (79%). 	[N.J.A.C. 7:27- 8.3(b)]	Satisfied	Inspection	Violations

Activity Number: PEA 010001

Document Type: AONOCAPA

Effective Start Date	Current Document Status and Date	Penalty Assessed	Amount Received
9/5/2001	Closed 10/16/2003	\$4,000.00	\$0.00

			Related	Related
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Description of Non-compliance	Violated Citation	Violation Status	Inspection	Violations
<p>In January 1999, you installed a hard chromium electroplating operation without first obtaining a preconstruction permit.</p> <p>The electroplating operation is composed of the following equipment:</p> <ul style="list-style-type: none"> - one 400-gallon tank directly vented to the scrubber contains acid chrome flake-chromic acid, water, sulfuric acid, and barium chloride; - three 50-gallon tanks contain rinse water; - one 40-gallon tank contains caustic soda (2%) and water (98%); and - one 15-gallon tank contains sulfuric acid (21%), muriatic acid (1%), and water (79%). 	[N.J.A.C. 7:27- 8.3(a)]	Satisfied	 Inspection	 Violations
<p>In January 1999, you operated a hard chromium electroplating operation without first having obtained a valid operating certificate.</p> <p>The electroplating operation is composed of the following equipment:</p> <ul style="list-style-type: none"> - one 400-gallon tank directly vented to the scrubber contains acid chrome flake-chromic acid, water, sulfuric acid, and barium chloride; - three 50-gallon tanks contain rinse water; - one 40-gallon tank contains caustic soda (2%) and water (98%); and - one 15-gallon tank contains sulfuric acid (21%), muriatic acid (1%), and water (79%). 	[N.J.A.C. 7:27- 8.3(b)]	Satisfied	 Inspection	 Violations

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Department of Environmental Protection
P. O. Box 402
Trenton, NJ 08625-0402

Last Updated: December 13, 2005

ATTACHMENT 7

Pollution Prevention Technology Profile - Trivalent Chromium Replacements for Hexavalent Chromium Plating, The Northeast Waste Management Officials' Association (NEMWOA), November 2003.

Pollution Prevention Technology Profile

Trivalent Chromium Replacements for Hexavalent Chromium Plating

November 18, 2003

Introduction

The purpose of this Technology Profile is to provide general information about trivalent chromium plating as a replacement for hexavalent chromium plating. Trivalent chromium is also known as tri-chrome, Cr^{+3} , and chrome (III), whereas hexavalent chromium is also known as hex-chrome, Cr^{+6} , and chrome (VI). The Profile has the following sections:

- Chromium Plating Overview
 - Hexavalent Chromium Technology
 - Regulatory Requirements
 - Non-Chromium Alternatives
- Trivalent Chromium Technology
 - P2 for Trivalent Chromium Baths
 - Current Research on Trivalent Chromium Baths
- Benefits and Challenges
- Foss Plating Case Study
- Contacts for More Information
 - Resources and Vendors
 - State Technical Assistance Programs
 - References

It should be noted that this Technology Profile is not intended to be an “approval” of this technology. The appropriateness of the use of trivalent chromium plating technologies should be determined on a site-by-site basis. Potential users should contact officials in the state in which the facility is located to determine the state-specific regulatory requirements that could apply. A listing of state contacts is located at the end of this Profile.

Chromium Plating Overview

The most common hexavalent chromium-bearing solutions include decorative and hard chromium, aluminum conversion coating, bright dipping of copper and copper alloys, chromic acid anodizing, and chromate conversion coatings on cadmium, zinc, silver and copper. This Technology Profile is for the use of trivalent chromium processes as replacements for decorative and hard hexavalent chromium processes.

Decorative Chromium

Decorative chromium plating provides a durable coating with a pleasing appearance and is usually deposited in a thickness range of 0.002 to 0.020 mils. It is most often applied over a bright nickel-plated deposit, which is usually deposited on substrates such as steel, aluminum, plastic, copper alloys and zinc die casting. Decorative chromium plating typically ranges from 0.005 mils to 0.01 mils in thickness. Common items with decorative chrome include appliances, jewelry, plastic knobs, hardware, hand tools, and automotive trim.

Hard Chromium

When chromium is applied for any other purpose, or when appearance is a lesser feature, the process is commonly referred to as hard chromium plating, or functional chromium plating. Hard chromium plating typically ranges from 0.1 to 10 mils thickness. Common applications of functional plating include: hydraulic cylinders and rods, crankshafts, printing plates/rolls, pistons for internal combustion engines, molds for plastic and fiberglass parts manufacture, and cutting tools. Functional chromium is commonly specified for rebuilding worn parts such as rolls, molding dies, cylinder liners, and crankshafts.

Chromium plating provides excellent hardness (typically 700-1,000 Vickers), bright appearance with no discoloration, and resistance to corrosive environments; it is easily applied and has a low cost. However, hexavalent chromium plating suffers from low cathode efficiency, poor metal distribution, lack of coverage around holes, and is very difficult to use in barrel plating. It is also a worker- and environment-unfriendly process. Some of the most important parameters for evaluating the effectiveness of chromium plating include: plating thickness, hardness, plating rate, and cathode efficiency.

Hexavalent Chromium Plating Technology

In the traditional hexavalent chrome plating process, the process steps are generally:

activation bath ? chromium bath ? rinse 1 ? rinse 2

The activation bath, if used, is a separate tank of chromic acid. The activation step is typically (depending on the alloy) a reverse current etch to prepare the surface of the parts to accept the plating by removing oxides from the surface of the material. Sometimes the activation step takes place in the chromium bath itself.

The composition of the chromium bath is chromic acid (CrO_3) and sulfate (SO_4), with ratios ranging from 75:1 to 250:1 by weight. The bath is extremely acidic with a pH of 0. The bath may be co-catalyzed with fluorides. In the chromic acid, the chromium is in the +6 oxidation state, which is reduced to Cr^{+3} , then to unstable Cr^{+2} and finally to Cr^0 . Some Cr^{+3} is necessary in the bath to act as a reducing agent, however, concentrations of Cr^{+3} exceeding 2-3% of the chromic acid content can cause problems. (Many specifications require that this concentration not exceed 1%). The presence of other oxides of metals (e.g., iron, copper, nickel) combined with the Cr^{+3} hinders bath performance.

In addition to bath composition, the other important parameters are temperature and current density. Together, these affect brightness and coverage. Generally, bath temperatures for decorative coating range from 95 to 115°F and 120 to 150°F for hard coating. Generally, the higher the current density is, the higher the temperature requirement. Current density also affects cathode efficiency. Agitation of the bath is required to equalize the bath temperature and promote uniform brightness on the part. Preheating the parts to be plated by placing them in the solution without current applied, may be necessary to obtain a uniform deposit.

The low cathode efficiency of the hexavalent chromium results in the major issue with chromium plating: poor coverage in low current density areas, and excessive build-up in high current density areas (e.g. part edges). The ability of a coating to cover the part uniformly is referred to as “throwing power.” In many cases, the part is over-plated, and ground back to final dimensions. In other cases, auxiliary anodes are used to provide more uniform coating of the part.

Regulatory Requirements

The principal ingredient in hexavalent chromium plating solutions is chromium trioxide (chromic acid). Chromium trioxide contains approximately 52% hexavalent chromium. Baths typically contain 28-32 ounces of hexavalent chromium per gallon. The hexavalent oxidation state is the most toxic form of chromium which has led to it being identified by the U.S. Environmental Protection Agency (EPA) as one of 17 “high priority” toxic chemicals for voluntary reduction through the 33/50 Program.

Air

Hexavalent chromium is a known human carcinogen and is listed as a hazardous air pollutant (HAP). Due to low cathode efficiency and high solution viscosity, hydrogen and oxygen bubbles are produced during the plating process, forming a mist of water and entrained hexavalent chromium. This mist is regulated under the Clean Air Act Amendments of 1990 and the Occupational Safety and Health Act of 1970.

On January 25, 1995, EPA published the Final Rule for its "National Emission Standards for Hard and Decorative Chromium Electroplating and Chromium Anodizing Tanks" (40 CFR Parts 9 and 63). EPA recently reduced the emission standards for chromium from 0.05 mg/m³ to 0.03 - 0.010 mg/m³, depending on the process, size of tank, and mist elimination technologies used. If a facility is using a trivalent chromium process for decorative plating, there is no emission standard; only recordkeeping and reporting requirements apply.

The Occupational Safety and Health Administration (OSHA) is scheduled to propose a new rule on hexavalent chromium compounds by October 10, 2004. The current permissible exposure limit, ceiling concentration, is 100 ug/m³.

Water

Chromium air emissions are frequently controlled by wet scrubbers. The discharge of these systems is treated with other process wastewaters. Wastewater that contains hexavalent chromium is treated first by acidification to 2.5 pH. This is followed by reduction of the hexavalent chromium to trivalent chromium using sulfur dioxide or sodium bisulfite. Finally, the solution is neutralized to precipitate the chromium as chromium hydroxide. Typical discharge concentrations for hexavalent and/or total chromium in wastewater are 0.1 to 1.0 ppm.

The EPA regulates chromium as a “priority pollutant” under the Clean Water Act. Under the Safe Drinking Water Act, a maximum contaminant level (MCL) is set for chromium at 0.1 parts per million (or 0.05 milligram/liter). The MCL is the maximum permissible level of a contaminant in drinking water from a public water system.

Waste

Under the Resource Conservation and Recovery Act (RCRA), chromium is a “hazardous constituent” and is a hazardous waste by toxicity characteristic if the concentration exceeds 5 mg/L (D007). Spent chromium plating baths are handled as hazardous waste. Precipitated chromium hydroxide sludges are regulated as F006 hazardous waste. For each pound of chromium that is lost to the waste treatment operations, 9.5 pounds of sludge (35% solids) are created.

In addition, lead anodes are typically used in hexavalent chromium plating. These anodes decompose over time, forming lead chromates, which slough off the anodes and deposit in the tank as lead chromate sludge that must be removed from the tank by filtering or pumping and disposed of as hazardous waste.

Hexavalent chromium plating solutions are typically treated with barium compounds to control the sulfate concentration by forming barium sulfate. This must also be disposed of as hazardous waste.

Right-to-Know Act

Under the Emergency Planning and Community Right-to-Know Act, Toxics Release Inventory (TRI) program, all large quantity (10,000 pounds/year) users of chromium must submit data on chromium releases and transfers.

Superfund

Under the Comprehensive Environmental Responsibility, Compensation and Liability Act (CERCLA, better known as Superfund), chromium is a “hazardous substance.” Users are liable for damages resulting from a release to the environment that occurs during past use or disposal practices. A company remains liable for its waste forever, even if the release to the environment occurs off-site at licensed disposal facility.

International

The European Union has adopted the End-of-Life Vehicle Directive in order to address the waste associated with vehicles at the end of their useful lives. The Directive aims to ensure the reuse, recycling

and recovery of end-of-life vehicles and their components. Hexavalent chromium is identified in the Directive as one of the hazardous materials used in the manufacture of vehicles. As such, it is banned from use in the manufacture of vehicles in the European Union nation states on July 1, 2003. This Directive is creating additional incentives for U.S. manufacturers to seek out alternatives to hexavalent chromium.

Non-Chromium Alternatives to Hexavalent Chromium

Due to increasing environmental and worker health concerns, some companies are seeking non-chromium alternatives for hard and decorative chromium applications. While non-chromium alternatives are not the focus of this Profile, limited information on some non-chromium alternatives is presented here.

The following table offers a summary of some of the non-chromium replacements for hard and decorative chromium baths. Many of the replacements are based on nickel which is also on EPA's list of 17 high priority chemicals for voluntary reduction through the 33/50 Program, along with chromium. Due to its complex mix of properties, no single coating will replace hexavalent chromium in all applications. Substitute coatings should be chosen based on the most important properties for each application. Solution trade names and manufacturers are included so that additional information can be obtained as needed. However, mention of any company, process, or product name should not be considered an endorsement by NEWMOA, NEWMOA member states, or U.S. EPA.

Table 1: Summary of Non-Chromium Substitutes for Hard and Decorative Chromium Baths

	Possible Non-Chromium Replacement	Notes	Vendor, Product
Electroplated nickel	Nickel-tungsten-boron	Uses conventional plating equipment and operates similar to a conventional nickel plating bath; may be more costly than hex chrome	AMPLATE
	Nickel-tungsten-silicon-carbide	May provide higher plating rates and higher cathode current efficiencies; may provide better throwing power and better wear resistance; may be more costly than hex chrome	Takada Inc.
	T in-nickel	Good corrosion resistance in strong acids, breaks down above 320C, less wear resistance than hex chrome	
	Nickel-iron-cobalt	Vendor claims twice the wear resistance and 2.6 times the corrosion resistance of hex chrome; same color can be obtained	Shining Surface Systems, METTEX 6 (http://www.surface-systems.com/presentation_6.html),
	Nickel-tungsten-cobalt	Contains no chloride or strong chelators; can be used in rack and barrel plating; good corrosion resistance except in marine environments; may tarnish; contains ammonia	Enthone, Enloy Ni-150 (http://www.afonline.com/articles/00sum03.html)
Non-nickel electroplate	T in-cobalt	Plate on nickel; decorative only	Seaboard Metal Finishing, Seachrome www.seaboardmetalfin.com
		Plate on decorative nickel and nickel alloy; may be used in racking; mildly alkaline	Enthone, Achrolyte
		Great color, light blue cast; no ammonia; no fluorides; no chlorides	MacDermid, CROMVET
	Cobalt Phosphorous	Nano-crystalline deposit produces extreme hardness; Plating current waveform modification (electrically mediated deposition) used to produce nanocrystalline deposit.	Integran Technologies, Inc. http://www.integran.com/
Electroless	Electroless nickel -nickel-tungsten -nickel-boron -nickel-diamond composite -nickel-phosphorous -nickel-polytetrafluorethylene	Possibly less hardness and abrasion resistance than hex; no build up on corners	Abrite, Millenium series, www.abrite.com MacDermid, NiKlad Sirius Surface Technology Micro Surface Corp.
Other Methods	HVOF (high velocity oxygenated fuel) thermal sprays	Hardness and wear resistance similar to hex chrome; limited to line-of-sight applications.	Sulzer Metco Western Hard Chrome
	Physical vapor deposition (PVD) -titanium nitride	Greater hardness than hex chrome with a thinner coating; less corrosion resistance	
	Ion beam-assisted PVD	Line-of-sight; thinner coatings give same properties as other thicker coatings	Skion Corp.
	Plasma spray -titanium carbide	Aluminum, steel, carbon steel, titanium substrates	A-Flame Corp.
	Chemical vapor deposition	Vacuum deposition; not limited to line-of-sight; resistant to acids; high deposition rate	
	Ion implantation	Ions are implanted – no thickness; non-line-of-sight	Southwest Research Institute
	Powder coating	Vacuum metallization (PVD) – has met OEM wheel industry testing requirements including ASTM B117, GM4472P, GM9508P, GM9682P, and GM6	PermaStar tm -Goodrich Technology Corp.
	Laser cladding	Non-line-of-sight; nickel carbide coating	Surface Treatment Technologies

Trivalent Chromium Plating Technology

In some applications and at certain thicknesses, trivalent chromium plating can replace hexavalent chromium. This is especially true for decorative applications where the trivalent chromium finish can closely resemble the hexavalent chromium finish. Generally, the trivalent chromium process is similar to that for hexavalent chromium except for the bath and the anode composition and/or configuration used. Trivalent chromium plating baths can be divided into the following three basic types:

1. Single electrolyte bath (chloride- or sulfate-based) using graphite or composite anodes and additives to prevent oxidation of trivalent chromium at the anodes.
2. Sulfate-based bath using shielded anodes (lead anodes surrounded by boxes filled with sulfuric acid) which prevent the trivalent chromium from reaching the anodes, thus preventing their oxidation.
3. Sulfate-based using insoluble catalytic anode that maintains an electrode potential level that prevents oxidation of the trivalent chromium.

Trivalent chromium baths overcome the shortcomings of hexavalent chromium in three general areas:

- Higher cathode efficiency
- Better throwing power
- Lower toxicity

Generally, the trivalent chromium plating rate and hardness of the deposit is similar to hexavalent chromium plating. Trivalent chromium baths also operate in the same temperature ranges as hexavalent chromium baths. Generally, the range of plating thickness for trivalent chromium is 0.005 to 0.050 mils.

Trivalent chromium baths tend to be more sensitive to metallic impurities than hexavalent chromium baths. Impurities can be removed by using ion exchange or precipitating agents followed by filtration.

When trivalent chromium plating was first introduced, decorative customers generally did not accept the different color tones compared to hexavalent chromium. However, additives to the trivalent chromium bath can often adjust the tone to customers' decorative coating needs.

To more closely resemble the functionality of hard chromium plating, pulse current plating has been used in a trivalent chromium solution. However, these thicker trivalent chromium finishes have not quite matched the corrosion resistance of a functional hexavalent chromium finish.

Pollution Prevention for Trivalent Chromium Baths

While the use of a trivalent chromium process instead of a hexavalent chromium process is more protective of human health and the environment in and of itself, the potential pollution resulting from the trivalent chromium processes can be further reduced by using pollution prevention techniques. For example, static rinse tanks can be used to capture the drag out for return to the plating tank for reuse in the bath makeup water. In addition, the plating bath can be recycled and recovered for reuse using porous pots, membrane electrolysis, or ion exchange.

Current Research on Trivalent Chromium Baths

Concurrent Technologies Corporation (www.ctc.com) is currently testing functional trivalent chromium coatings from a few vendors. The results of this work should be available in 2004; contact technical manager Margo Neidbalson (NeidbalM@ctcgsc.org) for additional information.

Research is on-going in the area of charge modulated electrodeposition to enhance the plating of trivalent chromium by eliminating the adverse effects of hydrogen in the bath. (See Faraday Technologies in the Vendor section).

Benefits and Challenges

The trivalent chromium products share these benefits and challenges for potential users when compared to hexavalent chromium plating.

Benefits

Air Emissions

The trivalent chromium processes have higher cathode efficiencies than hexavalent chromium plating which results in less chromium mist emitted into the air. Therefore, air pollution treatment requirements are significantly reduced. Because air treatment is typically by wet scrubbing, wastewater treatment requirements are also significantly reduced.

Wastewater Treatment and Hazardous Waste Generation

The trivalent chemistries have a lower concentration of chromium in the bath, generally, 2/3 to 1 ounce/gal (5-7.5 g/L) of trivalent chromium compared to 17-30 ounces/gal (130-225 g/L) for hexavalent chromium. Therefore, there is much less chromium in each of the wastewater streams that needs to be controlled. The reduction step in wastewater treatment is not required (eliminating the use of sodium bisulfate or other reducing agents and additional acid for pH control) and therefore, significantly less sludge (by volume) is produced.

In addition, with trivalent chromium the anodes do not decompose, eliminating the sludge associated with hexavalent chromium anode decomposition. The trivalent chromium processes produce approximately thirty times less sludge (by volume) than the use of hexavalent chromium baths which can significantly reduce hazardous material handling and disposal costs. In addition, the chromium in the wastes is not in the more hazardous hexavalent form.

Energy Use

The trivalent chromium processes require less current density, so less energy is used compared with the hexavalent chromium processes.

Product Quality

The throwing power is better in the trivalent chromium processes. The trivalent chromium processes can also withstand current interruption without sacrificing finish quality, whereas the hexavalent

chromium processes cannot. Therefore, a trivalent process has the potential to lower touchup and rework costs, and improve customer satisfaction.

Production Rate

Due to the improved throwing power, rack densities can often be increased significantly.

Lower Toxicity

The trivalent processes are inherently less toxic due to the oxidation state of the chromium. In addition, the trivalent chemistries also require a lower concentration of chromium in the bath, generally, 2/3 to 1 ounce/gal (5-7.5 g/L) of trivalent chromium compared to 17-30 ounces/gal (130-225 g/L) for hexavalent chromium. Therefore, the toxicity of the trivalent chromium plating solutions is much lower than hexavalent chromium solutions.

Worker Exposure

The lower toxicity of trivalent chromium combined with the lower concentration of chromium in the bath and the substantial reduction in hazardous waste sludge produced mean that less hazardous material has to be handled. In addition, substantially less air emissions are generated from the trivalent chromium process. Finally, trivalent chromium baths have a higher pH than hexavalent baths, reducing the potential for adverse damage. Therefore, the use of trivalent chromium solutions provides less potential for worker exposure.

Regulatory Compliance

It is becoming increasingly difficult to comply with air emissions and worker health requirements of hexavalent chromium plating operations. Due to its lower toxicity, trivalent chromium is not regulated as aggressively, and therefore, compliance costs such as monitoring and recordkeeping can be lower.

Challenges

Chromium

Trivalent chromium processes still contain chromium, and therefore, are still potentially hazardous and could be subject to future increased regulation.

Cost

The actual cost of the trivalent and hexavalent chromium processes are dependant on many factors and are difficult to compare in a general sense. In general, chemical costs for trivalent chromium plating are more costly than hexavalent chromium plating. However, when increased production rates, and the costs of hazardous waste sludge disposal, and compliance with the restrictions placed on the use of hexavalent chromium by the EPA and OSHA are factored in, the use of trivalent chromium may be a good option for some applications. In addition, as noted previously, in some instances product quality can be improved, reducing rework costs.

Technical Capabilities

The trivalent chromium process may require more careful control than the hexavalent chromium process.

As mentioned previously, trivalent chromium baths tend to be more sensitive to metallic impurities. In addition, trivalent chromium plating may not be suitable to replace every hexavalent chromium plating requirement. For example, barrel plating with trivalent chromium solutions is possible, but difficult. Process conditions, part configuration and other variables must be controlled for successful barrel plating.

Change

Hexavalent chromium plating has been an industry standard for many, many years. Customers have been satisfied with its range of properties and cost and therefore demand it. Specifications often require hexavalent chromium plating. Platers are used to running hexavalent chrome baths. Change can be difficult for people to seek out and/or accept.

Foss Plating Case Study

(from the California Department of Toxic Substance Control, *“Replacing Hexavalent Chromium Plating with Trivalent,”* City Square, CA: California Department of Toxic Substance Control, 1995.)

Foss Plating in Sante Fe Springs, California, is a small, family-run chrome plating shop that has been in business more than 40 years. They converted a hexavalent chromium plating line to a fully automated single chrome-cell (III) system in 1989. At that time, the cost of conversion was approximately \$30,000.

As a result of the conversion, Foss Plating realized a return on their investment within the first year of operating the chrome (III) system. They saw an increase in productivity, greater system efficiency, fewer rejects, and lower treatment costs. The better throwing power and covering power of chrome (III) allowed them to increase the surface area on the racks by 70 percent. At the same time, they experienced a more than 90 percent decrease in the number of rejected parts and eliminated almost all need for color buffing. Foss also found that chrome (III) plated more efficiently from an energy standpoint.

The two biggest disadvantages Foss Plating experienced with chrome (III) were discoloration from impurities in the bath and the need to passify the non-plated areas of the parts.

Contacts for More Information

Vendors of Trivalent Chromium Chemicals

Mention of any company, process, or product name should not be considered an endorsement by NEWMOA, NEWMOA member states, or U.S. EPA.

MacDermid Incorporated (www.macdermid.com)

Francis DiGiovanni, fdigiova@MacDermid.com, phone: 203-575-5700

produces TriMAC Envirochrome. TriMAC Envirochrome contains boric acid; the system uses insoluble iridium oxide anodes. According to the manufacturer, “the system requires less DC power, produces no misting, and provides good throwing power.” TriMAC Envirochrome has a hardness of 1300 HV.

Atotech (www.atotechusa.com)

produces TriChrome® Plus, a decorative trivalent chromium process. Atotech states that the bath has a low chromium metal content, exceptional covering power and produces a micro-discontinuous deposit. This process is most appropriate for rack plating needs.

Enthone OMI (www.enthone-omi.com)

Linda Wing, lwing@cooksonelectronics.com, phone 248-740-7607

produces Tricolyte III, a trivalent plating process for use over bright nickel or nickel-iron deposits. Tricolyte III contains hydrochloric acid and ammonium hydroxide. The process uses graphite anodes with copper cores or titanium hooks. Enthone states that the product “will finish 50-1000% more parts per rack” than hex-chrome baths. Tricolyte III is said to have “excellent quality because whitewash, burning and other rejects due to poor coverage are eliminated.”

Liquid Development Company (www.ldcbrushplate.com)

offers LDC 2403-HTC³, a trichrome solution to replace hard chrome in brush plating applications. LDC 2403-HTC³ deposits have a hardness of 900-1200HV and can produce a deposit thicker than .0005 inches (0.125 mils).

Faraday Technologies (www.faradaytechnology.com)

Phillip Miller, miller.faraday@erinet.com, phone: 937-836-7749

In partnership with Atotech, Faraday Technologies has developed an approach to chemistry and waveform modification to enable functional chromium deposition from a trivalent bath. The electrically-mediated chromium plating process uses a fairly simple trivalent chromium electrolyte to deposit a chromium coating that is comparable to hexavalent chromium in thickness, hardness and rate. The recently completed Phase II project has established that chromium deposits up to 10 mil are feasible from this process. While the rate required for quality deposition of thicker coatings is slower than that for thinner coatings (<3 mil), the rate is similar to the rate for hexavalent chromium deposition.

Typically hexavalent chromium plating is performed using cathodic DC current. In this case, the waveform is modified to include cathodic DC current, anodic DC current and relaxation, or zero current, phases. The modulation of these current phases, including frequency and peak amperages, allow:

- improvements in mass transfer of chromium ions to the part surface, improving plating rate; and,
- reduction in hydrogen evolution at the surface, reducing hydrogen embrittlement and improving deposit characteristics such as corrosion resistance, adhesion, lower porosity, deposit stress.

State Technical Assistance Programs

In Connecticut: Kim Trella Department of Environmental Protection 79 Elm Street Hartford, CT 06106 (860) 424-3242	In Maine: Peter Cooke Department of Environmental Protection 17 State House Station Augusta, ME 04333 (207) 287-6188
In Massachusetts: John Raschko Office of Technical Assistance 251 Causeway Street, Suite 900 Boston, MA 02114 (617) 292-1093	In Massachusetts: Linda Benevides, STEP Program Executive Office of Environmental Affairs 251 Causeway Street Boston, MA 02108 (617) 626-1197
In New Hampshire: Paul Lockwood Department of Environmental Services 6 Hazen Drive Concord, NH 03301 (603) 271-2956	In New Jersey: Ruth Foster Department of Environmental Protection 401 East State Street, PO Box 423 Trenton, NJ 08625 (609) 292-3600
In New York: Dennis Lucia Department of Environmental Conservation 50 Wolf Road Albany, NY 12233 (518) 457-2553	In Rhode Island: Rich Girasole Department of Environmental Management 235 Promenade Street Providence, RI 02908 (401) 222-4700, ext. 4414
In Vermont: Greg Lutchko Department of Environmental Conservation 103 South Main Street Waterbury, VT 05671 (802) 241-3627	At NEWMOA: Jennifer Griffith NEWMOA 129 Portland Street, 6 th Floor Boston, MA 02114 (617) 367-8558, ext. 303

References

Chessin, Hyman et al., "Chromium Plating" in *Metals Handbook – Volume 5*, Metal Park, OH: American Society for Metals.

Concurrent Technologies Corporation, "Information Source for Cadmium and Chromium Plating Alternatives," <http://www.cdcralternatives.ctc.com/>

DiGiovanni, Francis, MacDermid Incorporated, various e-mail communications, November 2003.

EPA, "Chromium Compounds," <http://www.epa.gov/ttn/atw/hlthef/chromium.html>

EPA, "Final Report: A Cost-Competitive Functional Trivalent Chromium Plating Process To Replace Hexavalent Chromium Plating"
http://cfpub.epa.gov/ncer_abstracts/index.cfm/fuseaction/display.abstractDetail/abstract/1363/report/F

EPA, "Guide to Cleaner Technologies: Alternative Metal Finishes," 1994,
<http://www.getf.org/file/toolmanager/O16F6379.pdf>

EPA, "National Emission Standards for Hard and Decorative Chromium Electroplating and Chromium Anodizing Tanks," 40 CFR Parts 9 and 63), <http://www.epa.gov/ttnatw01/chrome/chromepeg.html>

Graves, Beverly, "Alternatives to Hexavalent Chromium and Chromium Plating," Winter 2000: Automotive Finishing Online, <http://www.afonline.com/articles/00win02.html>

Northeast Waste Management Officials' Association, "Pollution Prevention for the Metal Finishing Industry: A Manual for Technical Assistance Providers," February 1997,
<http://www.wmrc.uiuc.edu/manuals/finishing/toc1.htm>

Occupational Safety and Health Administration, "OSHA Plans Proposed Rule on Hexavalent Chromium Compounds," 12/4/02,
http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=NEWS_RELEASES&p_id=9842 <http://www.osha.gov/pls/oshaweb>.

Shining Surface Systems, Inc., "Chromium Replacement: METTEX 6,"
http://www.surface-systems.com/presentation_6.html

Toxics Use Reduction Institute, "Chemical Factsheet: Hexavalent Chromium and Compounds," 2000.

Unknown, "Alternatives to Hexavalent Chromium," Institute of Advanced Manufacturing Sciences, Industry Sector Solutions Database, <http://www.iams.org/iamsorg/p2iris/metalfinish/1336-wi.htm>, copyright 1996, 1999.

Unknown, "Decorative Chromium Plate (Trivalent)," Institute of Advanced Manufacturing Sciences, Industry Sector Solutions Database, <http://www.iams.org/p2iris/metalfinish/1353-s.htm>, Copyright 1996, 1999

Wynn, Paul and Craig Bishop, "Replacing Hexavalent Chromium," February 2001: PF Online, <http://www.pfonline.com/articles/020102.html>

Zaki, Nabil, "Chromium Plating," 2003 Products Finishing Directory and Technology Guide, December 2002, and PF Online, 2000 Products Finishing Directory, <http://www.pfonline.com/articles/pfd0016.html>

The Northeast Waste Management Officials' Association (NEMWOA) is a nonprofit, nonpartisan interstates organization that addresses regional waste and pollution prevention issues. The membership is composed of state environmental agency directors of the hazardous waste, solid waste, waste site cleanup, pollution prevention and underground storage tank programs in Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Rhode Island, and Vermont. NEWMOA provides a forum for increased communication and cooperation among the member states, a vehicle for the development of unified position on various issues and programs, and a source for research and training.

ATTACHMENT 8

*NCO Financial Systems, Inc., Property Report, Wheaton Industries, 158 W. Weymouth Rd.,
Vineland, NJ 08360, April 8, 2010.*

April 8, 2010

Mr. Paul Cristalli
EDR
440 Wheelers Farms Road
Milford, CT 06460

Subject: REFERENCE #: 2732515.1
WHEATON INDUSTRIES
158 W. WEYMOUTH RD.
VINELAND, NJ 08360

Dear Mr. Cristalli:

Public records on the subject real property identified above revealed the following information effective to March 30, 2010:

PROPERTY REPORT

ASSESSMENT

Location: Cumberland County

Land/Description: Parcel of Land
Block 501, Lot 34

DEEDS

1

Grantee(s): Joseph DiMento Realty, LLC
(Buyer)

Grantor(s): Wheaton USA Inc., a corporation of the State of New Jersey
(Seller)

Conveys: Parcel of Land

Date Executed: April 27, 2001
Date Recorded: May 1, 2001
DBV/PG: 2508/192

NOTE: Copy attached as Exhibit "A."



2

Grantee(s): **Decora, Inc., a corporation of the State of New Jersey**
(Buyer)

Grantor(s): **Delsea Realty Corporation of Vineland, a corporation of the State**
(Seller) **of New Jersey**

Conveys: Parcel of Land

Date Executed: September 17, 1980
Date Recorded: September 18, 1980
DBV/PG: 1356/172

3

Grantee(s): **Delsea Realty Corporation of Vineland**
(Buyer)

Grantor(s): **Sidney Brody and Lois Brody, his wife**
(Seller)

Conveys: Parcel of Land

Date Executed: November 3, 1977
Date Recorded: November 15, 1977
DBV/PG: 1269/920

4

Grantee(s): **Lois M. Brody**
(Buyer)

Grantor(s): **Henry S. McNeil and Lois F. McNeil, his wife**
(Seller)

Conveys: Parcel of Land

Date Executed: December 19, 1973
Date Recorded: January 3, 1974
DBV/PG: 1217/842



5

Grantee(s): Henry S. McNeil and Lois F. McNeil, his wife
(Buyer)

Grantor(s): William P. Riggin, Sheriff
(Seller)

Conveys: Parcel of Land

Date Executed: May 15, 1969
Date Recorded: May 21, 1969
DBV/PG: 1152/605

6

Grantee(s): Atlantic Thermoplastics Corporation, a New Jersey corporation
(Buyer)

Grantor(s): E. Roger Jones and Helen G. Jones, his wife
(Seller)

Conveys: Parcel of Land

Date Executed: November 30, 1965
Date Recorded: December 6, 1965
DBV/PG: 1064/145

7

Grantee(s): E. Roger Jones and Helen G. Jones, his wife
(Buyer)

Grantor(s): Sidney Sweetman, Executor of the Last Will and Testament of
(Seller) James Sweetman, deceased

Conveys: Parcel of Land

Date Executed: July 13, 1960
Date Recorded: July 14, 1960
DBV/PG: 940/396

EXAMINER'S NOTE

Public records of Cumberland County, New Jersey were searched from January 1, 1940 to March 30, 2010, and no other deeds vesting title in the subject property were found of record during the period searched. James Sweetman owned the property prior to 1940.



LEGAL DESCRIPTION

Legal Description included on Exhibit "A."

We hope this information assists in your decision making process. If we can be of additional assistance, please do not hesitate to contact us at your convenience.

Cordially,

NCO FINANCIAL SYSTEMS, INC.
FINANCIAL INVESTIGATIVE SERVICES

Stewart Dowouis
Title Analyst

sd

cc: Chris Naquin

NCO File #822002

TERMS AND CONDITIONS

USE OF THIS REPORT: THIS REPORT CONTAINS INFORMATION OBTAINED FROM PUBLIC LAND RECORDS AND NCO FINANCIAL SYSTEMS, INC. - FINANCIAL INVESTIGATIVE SERVICES MAKES NO REPRESENTATION CONCERNING THE ACCURACY OF SAID PUBLIC RECORD INFORMATION OR THE INFORMATION CONTAINED IN THIS REPORT. THIS REPORT IS NOT AN ABSTRACT OR OPINION OF TITLE, TITLE COMMITMENT OR GUARANTEE, OR TITLE INSURANCE POLICY. THIS REPORT IS PROVIDED TO YOU AS A NCO FINANCIAL SYSTEMS, INC. - FINANCIAL INVESTIGATIVE SERVICES CUSTOMER AND IS NOT INTENDED FOR BENEFIT OF ANY THIRD PARTY.

LIMITATION OF LIABILITY: NCO FINANCIAL SYSTEMS, INC. - FINANCIAL INVESTIGATIVE SERVICES MAKES NO WARRANTY WITH RESPECT TO THIS REPORT. IF ANY INFORMATION CONTAINED IN THIS REPORT IS INACCURATE, YOU AGREE THAT NCO FINANCIAL SYSTEMS, INC. - FINANCIAL INVESTIGATIVE SERVICES' LIABILITY TO YOU IS LIMITED TO THE PRICE OF THIS REPORT. NCO FINANCIAL SYSTEMS, INC. - FINANCIAL INVESTIGATIVE SERVICES SHALL HAVE NO LIABILITY TO ANY THIRD PARTY UNDER ANY CIRCUMSTANCES. IN NO EVENT SHALL NCO FINANCIAL SYSTEMS, INC. - FINANCIAL INVESTIGATIVE SERVICES BE LIABLE FOR ANY SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES EVEN IF ADVISED THAT SUCH DAMAGES ARE POSSIBLE OR LIKELY.

EXHIBIT A

DEED

This Deed is made on April 27, 2001

Prepared by: (Print signer's name below signature)

Sanford Yosowitz
 Sanford Yosowitz

BETWEEN

Wheaton USA Inc.

a corporation of the state of New Jersey
 having its principal office at 1101 Wheaton Avenue, Millville, NJ 08332

referred to as the Grantor.

AND

Joseph DiMento Realty, LLC,

Cons: 299000.00 (S)
 Rlty: 1270.00 Cty: 299.00
 St: 747.50
 NPRF: 223.50
 Ins#: 58998 05/01/2001

whose post office address is 424 West Sherman Avenue and Brunetta Drive,
 Vineland, NJ 08360

referred to as the Grantee.

The word "Grantee" shall mean all Grantees listed above.

Transfer of Ownership. The Grantor grants and conveys (transfers ownership of) the property described below to the Grantee. This transfer is made for the sum of Two Hundred Ninety-Nine Thousand Dollars (\$299,000.00)

The Grantor acknowledges receipt of this money.

Tax Map Reference. (N.J.S.A. 46:15-2.1) Municipality of Vineland
 Block No. 82 Lot No. 12 Account No.

☐ No property tax identification number is available on the date of this Deed. (Check box if applicable.)

Property. The property consists of the land and all the buildings and structures on the land in the City of Vineland County of Cumberland and State of New Jersey. The legal description is: See attached legal description.

BEING, the same land and premises conveyed to Delsea Realty Corporation to Decora, Inc., a New Jersey corporation, by Deed dated September 17, 1980 and recorded in the Cumberland County Clerk's Office in Book 1356 of Deeds at Page 172 etc.

Decora, Inc., incorporated on August 17, 1977, was a wholly owned subsidiary of Wheaton Injection Molding Co., a New Jersey corporation.

Wheaton Injection Molding Co. merged with and into Wheaton Industries, a New Jersey corporation, on November 28, 1982, according to a Plan of Merger. The provisions of the Plan provided: "When the Plan shall have become effective, all and singular, the rights, privileges, powers and franchise of each of the corporations, parties to this Plan, whether of a public or private nature, and all property, real, personal and mixed, as well for stock subscriptions as all other things in action or belonging to either of said corporations shall be vested in the corporation which shall survive this merger..."

The corporation, Decora, Inc., was dissolved on December 4, 1984 (filed January 11, 1985). Its Directors voting to distribute all of its assets to its shareholders being, by virtue of the foregoing merger, Wheaton Industries.

Wheaton Industries (Inc.), a New Jersey corporation, by Amended and Restated Certificate of Incorporation filed with the Secretary of State of New Jersey on December 17, 1991, changed its name to Wheaton Packaging, Inc. Thereafter, by Certificate of Amendment to the Amended and Restated Certificate of Incorporation filed with the Secretary of State of New Jersey on January 13, 1992, it changed its name to Wheaton Inc. Thereafter, by Certificate of Amendment to the Amended and Restated Certificate of Incorporation of Wheaton Inc., filed with the Secretary of State of New Jersey on June 12, 1996, it changed its name to Lawson Mardon Wheaton Inc. Thereafter, by Certificate of Amendment to the Amended and Restated Certificate of Incorporation filed with the Secretary of State of New Jersey on January 27, 1999, it changed its name to Wheaton USA Inc.

5625-08 PG 193
JAMES W. COWAN, JR.

Professional Land Surveyor
1247 E. SHERMAN AVENUE
VINELAND, NEW JERSEY 08361

PHONE (856) 692-7524

James P. Cowan
James P. Cowan
N.J. Prof. Land Surveyor #42880

LEGAL DESCRIPTION

Joseph DiMento Realty, L.L.C.

Block 82, Lot 12, 158 W. Weymouth Road
City of Vineland, Cumberland County, New Jersey

April 23, 2001

BEGINNING at a point in the center line of Weymouth Road (50'), said point being the southwesterly corner of the E. Roger Jones 15-acre plot, North seventy-six degrees fifty minutes West, nine hundred one feet (N 76°50' W, 901') from the intersection of said center line of Weymouth Road with the westerly right-of-way line of the now or formerly West Jersey and Seashore Railroad (50'), and running; thence

(1) along the westerly line of said Jones plot, passing over a found re-bar with cap (Gleissner Noon Assoc.), North thirteen degrees ten minutes East, three hundred fifty and zero hundredths feet (N 13°10' E, 350.00') to a concrete monument marked "B" found at a point for a corner; thence

(2) South seventy-six degrees fifty minutes East, three hundred ten and zero hundredths feet (S 76°50' E, 310.00') to a concrete monument marked "B" found (at the top of a dirt and debris pile) at a point for a corner; thence

(3) passing over a re-bar with cap (Gleissner Noon Assoc.) found 25' from the center line of Weymouth Road, South thirteen degrees ten minutes West, three hundred fifty and zero hundredths feet (S 13°10' W, 350.00') to a point for a corner in the center line of Weymouth Road; thence

(4) along said center line of Weymouth Road, North seventy-six degrees fifty minutes West, three hundred ten and zero hundredths feet (N 76°50' W, 310.00') to a point for a corner and the PLACE OF BEGINNING.

CONTAINING 2.49 acres of land, more or less.

BEING Lot 12 of Block 82 as shown on the City of Vineland Tax Map sheet 5.

SUBJECT TO any easements, restrictions, or conditions of record, or which otherwise may exist.

Promises by Grantor. The Grantor promises that the Grantor has done no act to encumber the property. This promise is called a "covenant as to grantor's acts" (N.J.S.A. 46:4-6). This promise means that the Grantor has not allowed anyone else to obtain any legal rights which affect the property (such as by making a mortgage or allowing a judgment to be entered against the Grantor).

Signatures. This Deed is signed and attested to by the Grantor's proper corporate officers as of the date at the top of the first page. Its corporate seal is affixed.

Attested by:

WJS
William J. Schiavi, Assistant Secretary

By: *Sanford Yosowitz*
Sanford Yosowitz Vice President

STATE OF NEW JERSEY, COUNTY OF CUMBERLAND
I CERTIFY that on *April 27, 2001*
William J. Schiavi

SS.:

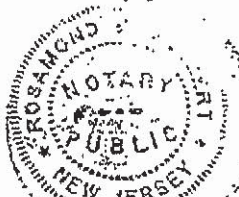
personally came before me and this person acknowledged under oath, to my satisfaction, that:

- (a) this person is the Assistant secretary of Wheaton USA Inc. the corporation named in this Deed;
- (b) this person is the attesting witness to the signing of this Deed by the proper corporate officer who is Sanford Yosowitz the Vice President of the corporation;
- (c) this Deed was signed and delivered by the corporation as its voluntary act duly authorized by a proper resolution of its Board of Directors;
- (d) this person knows the proper seal of the corporation which was affixed to this Deed;
- (e) this person signed this proof to attest to the truth of these facts; and
- (f) the full and actual consideration paid or to be paid for the transfer of title is \$ 299,000.00.

(Such consideration is defined in N.J.S.A. 46:15-5.)

Signed and sworn to before me on *April 27, 2001*.

Rosamond E. Bangert
(Print name of attesting witness below signature)



ROSAMOND E. BANGERT
NOTARY PUBLIC OF NEW JERSEY
My Commission Expires August 15, 2003

2

in compliance with the statute
have presented an abstract of the
within deed to the Assessor of the
taxing district therein mentioned.
GLORIA NOTO
Cumberland County Clerk

Grantor.

JOSEPH DIMENUTO REALTY, LLC

TO

Grantee.

WHEATON USA INC.

DEED

Dated:

, 19

Record and return to:

Wheaton USA
117 E. Kansas Ave
Suite C
Vincennes, IN 47590

L-10-25012-2602/7-700/8-2200/12-607

159150

01 58998

12 MAY 1984 ADMITTED TO RECORD
CUMBERLAND COUNTY, ILL.

01 MAY - 1 AM 11: 04

Gloria Noto
COUNTY CLERK

DEED BK 2508 PAGE 1999

BK2508pg195

ATTACHMENT 9

Internal NJDEP email dated March 5, 2002

From: Marc Bonfiglio
To: Msimpson
Date: 3/5/02 4:08PM
Subject: N. Vineland car wash

This facility is an unmanned manual car wash. I did not see any degreasers on site. There is a small office which was locked. I assume this is where they store Armor All and soap. These materials are highly unlikely to contain PCEs. The bays drain into a large septic field which was of good integrity. Altho there is nothing that would preclude someone from dumping solvents down the drain of the wash bays, it is unlikely that the car wash itself is the culprit here.

Since nobody was home I couldn't issue a NOV but Ed said that permitting wouldn't issue a uic permit anyhow. What should I do next? I will be in Cinnaminson doing their coll. system on Wednesday. Call me on my cell if you need to speak with me. If need be I can pay another visit assuming I can wrap up Cinnaminson early (which is unlikely due to their extraneous flows).

ATTACHMENT 10

Internal NJDEP email dated March 7, 2002

From: Edward Post
To: JHamilto; TPilawsk; WHowitz
Date: 3/7/02 4:55PM
Subject: Fwd: N. Vineland car wash

Here's Marc's info from a visit to the North Vineland car wash referred by Wayne.

Marc found no evidence that it's a solvent source for ground water pollution, BUT he couldn't rule out dumping into the drains. Perhaps SR could sample the septic system to see if it's a likely source of the VOC contamination.

We will track down the owner and issue a NOV for the unpermitted discharge and work with permitting concerning what can/should be permitted at the site.

Ed

CC: MBonfigli; MSimpson; RBennett

ATTACHMENT 11

NJDEP Engagement letter to GHR Consulting Services, NJDEP August 11, 2003

State of New Jersey
Department of Environmental Protection
Site Remediation Program
Bureau of Site Assessment
P.O. Box 407
Trenton, NJ 08625-0407

GLACKIN
800-673-7965 x232

James E. McGreevy
Governor

Bradley Campbell
Commissioner

August 11, 2003

GHR Consulting Services
Building Three, Suite 110
Horsham, PA 19044-2209
Attn: Chris Glackin

Re: North Vineland Car Wash, 130 West Weymouth Road,
Vineland, New Jersey

Dear Mr. Glackin:

As we discussed this date, this letter serves notice that the NJDEP intends to engage GHR under the 00-x-34496 Field Sampling Services Term Contract for work at the North Vineland Car Wash relative to NJDEP's North Vineland Unknown Source Investigation.

BACKGROUND

During 1987, the NJDEP delineated an area in northern Vineland which exhibited volatile organics contamination in potable wells. The contaminants were tetrachloroethylene (PCE), trichloroethylene (TCE), dichloroethylene (DCE) and trichloroethane (TCA) which impacted an area containing 152 residential wells. The highest contamination at any well was 90 ppb PCE, 1,200 ppb TCE, 7.6 ppb DCE and 2.1 ppb TCA.

The NJDEP has identified a number of potential source areas which are clustered at Weymouth Road and North West Boulevard (see Overview Map). Of these properties, the North Vineland Car Wash (NVCW) has not been reviewed thoroughly. This investigation is meant to provide the necessary information to evaluate the NVCW.

SCOPE OF WORK

The scope of work for this job has 3 phases which shall be carried out without time gaps between phases. Phase 1 requires the installation of 6 temporary piezometers on or within 300 feet of the NVCW (see proposed sampling locations map). Phase 2 requires the measurement of static water levels for installed piezometers and surveying of top of same. Phase 3 requires Geoprobe vertical profile ground water sampling for VOCs with on-site GC. The plan calls for sampling to proceed to 48 feet below grade, but some deep intervals or whole locations may be abandoned depending upon on-site GC results. While the NJDEP has no firm start date for this work, it should be noted that access is all but assured at this time.

ENGAGEMENT REQUIREMENTS

Prior to initiating the engagement process with GHR, the NJDEP requests that GHR provide an acceptance letter for this engagement. In the acceptance letter, it is requested that GHR provide a tentative schedule for the work.

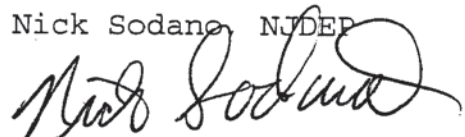
Please find attached a Workplan (Scope of Work) and the cost estimate for the site. Please review these and provide the noted letter if acceptable. Once your letter is received and access has been confirmed, the NJDEP will issue a purchase order for the work. We will contact you if any delay occurs which would impact your tentative schedule.

Additionally, please provide a Conflict of Interest Certification to address the following potentially responsible parties for this case: a. ShieldAlloy Metallurgical Corporation; b. Lawson, Mardon, Wheaton Inc., (formerly Wheaton Industries); c. Fischer & Porter Electronics (Former Andrews Glass); and d. North Vineland Car Wash.

Should you have any questions or concerns, please notify me at (609) 584-4275.

Sincerely,

Nick Sodano, NJDEP



ATTACHMENT 12

NCO Financial Systems, Inc., Property Report, North Vineland Car Wash, 130 W. Weymouth Rd., Vineland, NJ 08360, April 8, 2010.

April 8, 2010

Mr. Paul Cristalli
EDR
440 Wheelers Farms Road
Milford, CT 06460

Subject: REFERENCE #: 2732515.2
 NORTH VINELAND CAR WASH
 130 W. WEYMOUTH RD.
 VINELAND, NJ 08360

Dear Mr. Cristalli:

Public records on the subject real property identified above revealed the following information effective to March 30, 2010:

PROPERTY REPORT

ASSESSMENT

Location: **Cumberland County**

Land/Description: Parcel of Land
 Block 501, Lot 33

DEEDS

1
Grantee(s): **David Guidarini**
(Buyer)

Grantor(s): **Andrea DiOrio**
(Seller)

Conveys: Parcel of Land

 Date Executed: August 18, 2001
 Date Recorded: August 23, 2001
 DBV/PG: 2533/5

NOTE: Copy attached as Exhibit "A."



2

Grantee(s): **Andrea DiOrio**
(Buyer)

Grantor(s): **Lynne Elizabeth Fiocchi, Executrix and Sole Beneficiary of the**
(Seller) **Estate of August Joseph Fiocchi, deceased**

Conveys: Parcel of Land

Date Executed: July 3, 1996
Date Recorded: July 8, 1996
DBV/PG: 2184/194

3

Grantee(s): **August Fiocchi**
(Buyer)

Grantor(s): **Michael M. Rossi, III**
(Seller)

Conveys: Parcel of Land

Date Executed: June 1, 1987
Date Recorded: August 13, 1987
DBV/PG: 1676/187

4

Grantee(s): **Michael M. Rossi, III**
(Buyer)

Grantor(s): **Michael D. Jones and Sandra L. Jones, his wife**
(Seller)

Conveys: Parcel of Land

Date Executed: April 5, 1985
Date Recorded: April 12, 1985
DBV/PG: 1549/163



5

Grantee(s): **Michael D. Jones and Sandra L. Jones, his wife**
(Buyer)

Grantor(s): **E. Roger Jones and Helen G. Jones, his wife**
(Seller)

Conveys: Parcel of Land

Date Executed: June 1, 1979
Date Recorded: December 28, 1979
DBV/PG: 1324/191

6

Grantee(s): **E. Roger Jones and Helen G. Jones, his wife**
(Buyer)

Grantor(s): **Sidney Sweetman, Executor of the Last Will and Testament of**
(Seller) **James Sweetman, deceased**

Conveys: Parcel of Land

Date Executed: July 13, 1960
Date Recorded: July 14, 1960
DBV/PG: 940/396

EXAMINER'S NOTE

Public records of Cumberland County, New Jersey were searched from January 1, 1940 to March 30, 2010, and no other deeds vesting title in the subject property were found of record during the period searched. James Sweetman owned the property prior to 1940.

LEGAL DESCRIPTION

Legal Description included on Exhibit "A."



We hope this information assists in your decision making process. If we can be of additional assistance, please do not hesitate to contact us at your convenience.

Cordially,

NCO FINANCIAL SYSTEMS, INC.
FINANCIAL INVESTIGATIVE SERVICES

Stewart Dowouis
Title Analyst

sd

cc: Chris Naquin

NCO File #822001

TERMS AND CONDITIONS

USE OF THIS REPORT: THIS REPORT CONTAINS INFORMATION OBTAINED FROM PUBLIC LAND RECORDS AND NCO FINANCIAL SYSTEMS, INC. - FINANCIAL INVESTIGATIVE SERVICES MAKES NO REPRESENTATION CONCERNING THE ACCURACY OF SAID PUBLIC RECORD INFORMATION OR THE INFORMATION CONTAINED IN THIS REPORT. THIS REPORT IS NOT AN ABSTRACT OR OPINION OF TITLE, TITLE COMMITMENT OR GUARANTEE, OR TITLE INSURANCE POLICY. THIS REPORT IS PROVIDED TO YOU AS A NCO FINANCIAL SYSTEMS, INC. - FINANCIAL INVESTIGATIVE SERVICES CUSTOMER AND IS NOT INTENDED FOR BENEFIT OF ANY THIRD PARTY.

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EXHIBIT A

Cons: 35000.00 (S)
Rlty: 122.50 Cty: 35.00
St: 87.50
NPRF: 0.00
Ins# 64739 08/23/2001

BK2533PG005

DEED

This Deed is made on August /8, 2001, between

ANDREA DIORIO, 1315 Rogers Avenue, Vineland, New Jersey 08360,

Grantor, and

DAVID GUIDARINI, 1060 New Pear Street, Vineland, New Jersey 08360,

Grantee.

(The words "Grantor" and "Grantee" include all Grantors and all Grantees under this Deed.)

In return for the payment to them of Thirty-five Thousand and no/100 dollars (\$35,000.00), the Grantor grants and conveys to the Grantee all of the land located in the City of Vineland, County of Cumberland and State of New Jersey, specifically described as follows:

BEGINNING at a point in the center line of Weymouth Road (50 feet wide), 441 feet North 76 degrees 50 minutes West of the intersection of the center line of Weymouth Road with the Westerly right of way of Conrail Pennsylvania Reading Seashore Line, Millville Branch (formerly West Jersey and Seashore Railroad) (50 feet wide); thence

(1) North 76 degrees 50 minutes West, along the centerline of Weymouth Road, 150 feet to a point; thence

(2) North 13 degrees 10 minutes East, 350 feet to a point; thence

(3) North 75 degrees 05 minutes East, 54 feet to a point; thence

(4) South 86 degrees 15 minutes East, 35 feet to a point; thence

(5) South 04 degrees 15 minutes East, 200 feet to a point; thence

(6) South 86 degrees 15 minutes East, 8.08 feet to a point; thence

(7) South 13 degrees 10 minutes West, 191.64 feet to a point in the center line of Weymouth Road and place of **BEGINNING**

COMMONLY KNOWN AS 130 West Weymouth Road

BEING the same lands and premises conveyed to Grantor by deed of Lynne Elizabeth Fiocchi, Executrix and sole beneficiary of the Estate of August Joseph Fiocchi, deceased, dated July 3, 1996, and recorded in the Office of the Clerk of Cumberland County in Book 2184 of Deeds, Page 194; etc.

NOTON ARIQIS
FIELD (1996) 1996/07/03

This Deed was prepared by: STEPHEN B. PATRICK
Name

Stephen B. Patrick
Signature

EX-203-2000-06

The land is now designated as Lot 11 in Block 82 on the municipal tax map.

The Grantor covenants that the Grantor has done no act to encumber the land

The Grantor has received the full payment from the Grantee.

The Grantor signs this Deed on the first date above. If the Grantor is a corporation, this Deed is signed by its corporate officers and its corporate seal is affixed.

Signed, sealed and delivered in the presence
or attested by:

Andrea Diorio (LS)
ANDREA DIORIO

Stephen B. Patrick

(LS)

CERTIFICATE OF ACKNOWLEDGMENT BY INDIVIDUAL

State of New Jersey, County of Hancock

I am an attorney at law of the State of New Jersey,
an officer authorized to take acknowledgments and proofs in this State. I sign this acknowledgment below to
certify that it was made before me.

On August 18, 2001, Andrea DiOrio

appeared before me in person. (If more than one person appears, the words "this person" shall include all persons
named who appeared before the officer and made this acknowledgment). I am satisfied that this person is the
person named in and who signed this Deed. This person acknowledged signing, sealing and delivering this Deed
as this person's act and deed for the uses and purposes expressed in this Deed.

This person also acknowledged that the full and actual consideration paid or to be paid for the transfer of
title to realty evidenced by this Deed, as such consideration is defined in P.L. 1968, c. 49, §1(c), is \$35,000.00

Stephen B. Patrick
Office's signature. Print, stamp or type name and title directly beneath
STEPHEN B. PATRICK
Attorney at Law of New Jersey

In compliance with the statute I
have presented an abstract of the
within deed to the Assessor of the
taxing district therein mentioned.

GLORIA NOTO
Cumberland County Clerk

2/28 RTR 124.50

194783M
01 64739

ADMITTED TO RECORD
CUMBERLAND COUNTY, N.J.

01 AUG 23 PM 3:41

Gloria Noto
COUNTY CLERK

DEED BK 2599 PAGE 510

Deed

ANDREA DIORIO,

Grantor

to

DAVID GUIDARINI,

Grantee

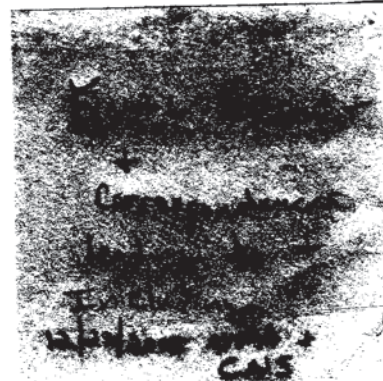
Record and return to: SASE

Stephen B. Patrick, Esquire
PO Box 795
Newfield, NJ 08344

ATTACHMENT 13

Final Groundwater Report, Andrews Glass Company Facility, ISRA Case No. E94164, Sigma Environmental Services, Inc., May 2006

FINAL GROUNDWATER REPORT



**ANDREWS GLASS COMPANY FACILITY
(Formerly Owned By The Fischer & Porter Company)
VINELAND, NEW JERSEY**

ISRA Case No. E94164

FOR

**ABB, Inc.
Warminster, Pennsylvania**

MAY 2006

Prepared By



Sigma Environmental Services, Inc.
1514 Harmon Road, Harleysville, Pennsylvania 19438
610-287-6240

EXECUTIVE SUMMARY

General Background

This report is being submitted to the New Jersey Department of Environmental Protection (NJDEP) to document the historic and current data related to PCE contamination in groundwater in the vicinity of 3740 North West Boulevard, Vineland, New Jersey ("the Property"). The Property formerly was operated by The Fischer & Porter Company, at which time the operating facility was known as the Andrews Glass Company ("the Facility"). ABB, Inc. ("the Company"), through a series of corporate transactions, is the successor to The Fischer & Porter Company. As discussed below, The Fischer & Porter operations were conducted at the Property from February 1961 through November 1994.

In 1994, in connection with a sale of stock and a subsequent cessation of operations at the Property, compliance with the New Jersey Industrial Site Recovery Act (ISRA) was initiated. Subsequently, in November 1996, the Property was sold to the current owner, C & C Investments, a New Jersey partnership.

Prior to entering the ISRA program, the Facility operating at the Property was under the jurisdiction of the NJPDES program. NJDEP had issued a Discharge to Groundwater Permit (NJPDES Permit No. NJ0063797, effective September 15, 1987) to the Facility in connection with discharges to two industrial waste water septic systems. One industrial waste water septic system was located in the northern section of the Property and the other was located in the southwestern area.

As part of NJPDES compliance, in addition to monitoring waste water quality in two waste water collection sumps part of the northern industrial waste water septic system, six monitoring wells had been installed and were monitored on a quarterly basis from January 1988 to July 1992. These wells monitored groundwater quality in the areas of the southwestern, as well as the northern, system.

The nature of the discharges to the industrial septic system changed over time. After September 1986, the Facility discharge consisted only of non-contact cooling water. Use of the southwestern industrial waste water septic system was terminated first, ending in 1986. By February 1992, the discharge of non-contact cooling water to the northern industrial waste water septic system also had been discontinued. Sampling of the monitoring wells ceased approximately six months after all discharges from the facility to the industrial waste water septic systems terminated in their entirety.

In March 1993, the inactive northern and southwestern industrial waste water septic systems were removed under NJDEP oversight. Prior to and after their removal, a series of environmental investigations – including a soil vapor survey, sludge sampling, sediment sampling and both pre- and post-excavation soil sampling – were conducted, also under NJDEP oversight. Reports were prepared and submitted to NJDEP concerning the results of the investigations and the system removals.

As part of ISRA compliance as well, a number of soil and groundwater sampling events occurred. Soil samples were collected in the area of the former industrial waste water septic systems to confirm no unacceptable contaminant concentrations were present. A number of groundwater monitoring events also were conducted during the course of ISRA compliance. Reports of all compliance activities were prepared and submitted to NJDEP. (See **Attachment A** for a list of the reports previously submitted to NJDEP.).

In the course of evaluating groundwater quality conditions at the Property, NJDEP files concerning other properties, including properties in the downgradient residential area and properties directly adjacent in both the upgradient and downgradient directions, including the Federal Superfund Site known as the Shieldalloy Metallurgical Corporation ("SMC") located across the street, were reviewed. These files document that various concentrations of the same contaminants found in the groundwater at the Property also were present in groundwater at these other sites, at some sites historically and in others during approximately the same time period as they were present at the Property, although in greater concentrations than those reported at the Property. As part of ISRA compliance, the Company filed a number of reports with NJDEP summarizing the data from these files to support the Company's disagreement with NJDEP allegations that historically, discharges at the Property contributed to degraded groundwater quality in the general downgradient area, as well as to demonstrate that currently degraded groundwater conditions at the Property's downgradient boundary were not related to any conditions at the Property.

In a separate, but somewhat related matter, NJDEP was seeking repayment from the Company of expenditures previously made by the Spill Compensation Fund pursuant to the New Jersey Spill Act to North Vineland residents and Vineland City. These payments were made in connection with extension of the city's municipal water system to areas of North Vineland and residents' connection to the municipal water supply in replacement of their individual potable wells, which were contaminated with a number of chemicals. The Company disputed NJDEP allegations of the Company's liability in connection with these expenditures under the Spill Act and raised other defenses to the repayment demand.

In December 2004, NJDEP and the Administrator of the Spill Fund filed suit in Superior Court against the Company and the current Property owner. Generally, the lawsuit sought certain remedial activities both on and off-site of the Property, reimbursement of expended Spill Fund monies, and compensation for alleged natural resource damages. The lawsuit also sought further compliance with ISRA.

Company representatives met with NJDEP representatives in the fall of 2005 to discuss settlement. The Company and its environmental consultant presented groundwater quality data immediately upgradient from the Property, which had been filed pursuant to that upgradient site's NJPDES permit. This data had not previously been available for review by the NJDEP personnel involved with ISRA compliance for the Property. This data supported the Company's position regarding the upgradient presence of contaminant

concentrations exceeding those found during groundwater monitoring at the Property. Additionally, a 2005 NJDEP report concerning historical and current groundwater conditions present at two sites adjacent to the Property's downgradient boundary, based on historical records review and recent soil and groundwater investigations conducted by NJDEP, had recently become available. The data and conclusions in the 2005 NJDEP report supported the Company's position that degraded groundwater conditions present at the Property's down gradient boundary were representative of conditions at the adjacent properties and were not related to the former Fischer & Porter operations or current Property conditions.

In the course of settlement discussions concerning resolution of further investigative or remedial activities on and/or off-site, which included completion of the pending ISRA compliance matter, the Company agreed to collect current groundwater quality data at the Property and provide this report to substantiate that no further action by the Company was necessary since Property conditions were not contributing to groundwater degradation and were not otherwise a threat to human health or the environment. NJDEP required collection and analysis of groundwater samples in order to confirm current conditions at the Property and to allow comparison of this data to that collected recently by NJDEP at the two adjacent down gradient properties. The Company thereafter conducted the agreed upon groundwater sampling in December 2005.

Data Summary

The Property is located in an area of industrial/commercial usage and small businesses in North Vineland, New Jersey near the south end of Newfield Borough (Figure 1). Residential properties are located both up and down gradient, often with a section of the residential property also used for industrial/commercial purposes. Prior to development, property in this area was generally undisturbed wooded land or farmland. Sanitary sewers historically were not and presently are not available, and therefore, properties in this area of North Vineland include one or more on-site septic systems for waste discharge.

Based on historical information in NJDEP files, as well as other information in the public domain concerning both past and present products readily available, it was not uncommon for PCE to be in use in the North Vineland area. PCE was commonly used as a degreasing agent by commercial and industrial facilities and it was a component of a variety of across-the-counter, consumer paint and finish strippers, metal cleaners, automotive engine and brake cleaners, and other similar products. One such product is marketed specifically for cleaning stainless steel, which for the past several years has been the most popular finish for residential kitchen appliances, hardware and sinks. These products remain available today and still contain high concentrations of PCE. PCE also historically was used to clean residential septic systems.

Based on a review of NJDEP files, it was determined that there were multiple sources of PCE contamination in the groundwater both upgradient (to the north-east) and

downgradient (to the south-west) of the Property. Historically, NJDEP records documented PCE concentrations detected in a well on Catawba Avenue, approximately 1/4 mile northeast of the Property. NJDEP records also documented PCE concentrations detected at the Research Glass property, which is adjacent and north/northeast of the Property.

Additionally, low concentrations of PCE were reported in monitoring wells on the large SMC manufacturing site across the street from the Property. Low PCE concentrations also were found in soils directly under a failed liner of one of the SMC waste water lagoons, which initially had been operated without a liner. Although SMC did not report any PCE use, historically it conducted a significant TCE degreasing operation, with accompanying TCE distilling and recovery. Industrial grade TCE can contain as much as 12% PCE, according to industry literature.

Although Research Glass also did not admit to use of PCE onsite, groundwater data from wells installed to monitor the wastewater system and a former UST at the Research Glass site document the presence of concentrations of PCE exceeding those found at the Property during substantially the same monitoring periods. The Research Glass data, which was on file in NJDEP records pertaining to the NJPDES program, also documented groundwater degradation by lead and BTEX contamination from a leaking underground gasoline storage tank that was located on the side of the Research Glass site adjoining the Property, which also would have affected groundwater conditions (Section 3.2.3, p.15).

The PCE concentrations detected in Research Glass NJPDES well MW-1 were routinely higher than the concentrations detected in the Company's well MW-2, which is the first Property well downgradient of the Research Glass Property and the monitoring well closest to the Property's northern industrial wastewater system where concentrations of PCE were detected. The elevated concentrations of PCE at the Research Glass site occurred both before and after the Company ceased all wastewater discharges, completely removed the entire northern industrial wastewater system, and ceased all operations at the Property. This highlights the potential presence of a PCE source on the Research Glass property, but in any event, a source undoubtedly other than Facility operations or Property conditions.

The Company undertook a variety of investigations and fully remediated Property septic sludges and soils containing concentrations of PCE. The sampling conducted both prior to and after the industrial waste water septic systems were closed under NJDEP oversight indicated that PCE concentrations were only present at the northern industrial waste water septic system area. Post-excavation sampling confirmed that PCE concentrations in soils had been remediated to well below the most stringent NJDEP soil cleanup criteria. In comparison, no investigation or remediation of PCE sources at Research Glass or other up gradient areas was performed. There were no records in NJDEP files indicating that any inquiry concerning the potential sources of PCE detected in the well on Catawba Avenue occurred. Research Glass was allowed to close its monitoring wells and therefore, no data are available after 1997.

With respect to groundwater quality downgradient of the Property, historically, PCE concentrations detected in the monitoring wells located on the former Wheaton site, which is adjacent to the southern Property boundary, were consistently higher than the PCE concentrations detected in the monitoring wells at the Property. The long-established, unattended, self-serve car wash, which shares the Property's southern boundary along with the former Wheaton site, also has a significant potential to be a source of PCE contamination due to the use of readily available automotive products, such as brake and engine cleaners, that contain PCE. An empty can of such a product was found adjacent to the car wash entrance during a walk through the area, illustrating the likelihood that, despite signs prohibiting engine washing and the use of hazardous materials at the car wash, such products were used on site by its patrons (Section 3.3.2, p.22).

By May 1994, 19 quarters of groundwater sampling of monitoring well 5 ("MW-5") at the Property had indicated either non-detectable or estimated single-digit PCE concentrations for 17 events. MW-5 was installed to monitor groundwater conditions proximate to the southwestern septic system and is more side-gradient than down-gradient to the northern septic system. In the course of collecting groundwater samples along the down gradient Property line via temporary well points, PCE concentrations of 180 ppb were detected near MW-5. The Company then installed MW-7 in this area, approximately 17 feet from MW-5. In effect this placed MW-7 directly on the Property's down gradient property line. Subsequent samples collected from MW-7 and MW-5 indicated elevated PCE concentrations at MW-7 that were not present at MW-5 (Section 3.3.1, p.20).

The Company concluded that the rapid decrease in PCE concentrations from MW-7 to MW-5, which generally reproduced a similar decrease noted in groundwater samples collected from GeoProbe™ points progressively further into the Property as well along the Property line to both sides of where MW-7 was installed, demonstrated that the degraded groundwater condition was representative of conditions at the car wash and/or former Wheaton sites, not the Property itself. This conclusion also was based, in part, on historical data in NJDEP records concerning sludge, soil, soil vapor and groundwater data collected at the former Wheaton property and the visibly contaminated waste water in the car wash septic sumps.

In 2003 and 2004, NJDEP conducted a review of historical NJDEP records concerning the car wash and the former Wheaton sites and conducted subsurface investigations on these sites. A report on the investigation and its findings was issued in early 2005 ("the 2005 NJDEP Report"). Data collected by NJDEP in 2003 and 2004 documented that concentrations of PCE present in groundwater between the car wash and the former Wheaton site were elevated above the concentrations found in Property monitoring wells 5 and 7 (Section 3.3.3, p. 23).

Additionally, data from these NJDEP investigations documented a localized hydrogeologic anomaly in the area where the Property, the Wheaton site, and the car

wash site meet. Potentiometric data collected by NJDEP indicated that the hydraulic gradient in this area is extremely low and that the groundwater flow pattern likely varies in response to mounding caused by discharges to the septic systems at the rear of the car wash, which are proximate to the Property boundary and MW-7, and at the side of the Wheaton site, which also is close to the Property and MW-7. Mounding in this area can result in a radial flow pattern that would direct groundwater and potential contaminants from the car wash and former Wheaton sites towards the Property and MW-7. This groundwater flow and the elevated PCE concentrations that have occurred at the Wheaton site substantiate that the PCE observed in Property wells MW-5 and MW-7 originated offsite.

Current Property Groundwater Quality

Current data from the monitoring wells at the Property indicate that there is no significant residual PCE present in groundwater at the Property. Of monitoring wells 2, 3 and 6, which were installed to monitor groundwater from the northern septic system, only MW-2 exhibited detectable concentrations of PCE, and then at 1.5 ppb. The trace concentration detected in well MW-2 in December 2005 may be representative of a minor residual impact from an up gradient source (Section 3.3.4, p.27).

Groundwater samples collected in December 2005 from the Property wells at the southern Property boundary indicated that very low PCE concentration were still present in well MW-5 (2.23 ug/l), with higher concentration present at well MW-7 (50.6 ug/l). This distribution between MW-5 and MW-7 repeats the pattern found during past monitoring events. Additionally, the 2005 concentrations represent an almost 50% reduction from the concentration detected during the last routine sampling event in 1995. Based on other data documenting Property conditions and the repetitive nature of this distribution taken in the context of the findings of the 2005 NJDEP Report, it is the groundwater and other environmental conditions located at the car wash and the former Wheaton property, and not Property conditions, that are reflected in MW-7 data.

Conclusions

Based on the groundwater flow pattern and the presence of confirmed offsite sources of PCE immediately south of the Property's down gradient boundary, the data indicates that the PCE detected in Property well MW-7 originates offsite. Additionally, the historical Research Glass data documented that groundwater up gradient from the Property contained higher concentrations of PCE than those monitored in the area of the Property's former northern septic system. The higher PCE concentrations in groundwater at Research Glass require consideration, and place PCE concentrations in Property monitoring wells in a context that supports resolution of the Company's ISRA compliance.

Based on all of the above, including the effectiveness of the remedial activities conducted

at the Property and the most recent groundwater data, it can be concluded that there is no source of PCE present on the Property. Additionally, the only detectable PCE concentrations present in groundwater at the Property exist proximate to off-site areas where concentrations of PCE in excess of those now or in the past found in Property groundwater have been documented. Therefore, the Property does not represent a risk to human health or the environment and no further actions by the Company with respect to soils or groundwater, both on- and off-site, are warranted.

The Company requests NJDEP conclude that the Company's ISRA compliance is complete and issue a No Further Action Letter and Covenant Not to Sue.

EXECUTIVE SUMMARY

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ATTACHMENTS

Attachment A	Summary of Historic Reports Submitted to NJDEP
Attachment B	December 2005 Sampling Record forms
Attachment C	SMC Recovery Well Capture Zone/Potentiometric Maps
Attachment D	Wheaton Soil Vapor Survey Data
Attachment E	NJDEP Sampling Locations at NVCW/Wheaton
Attachment F	Examples of Products Containing PCE

FIGURES

Figure 1	Site Location Map
Figure 2	Site Plan
Figure 3	Potentiometric Surface Contour Map
Figure 4	Car Wash Drain Field
Figure 5	Former Wheaton Site Drain System
Figure 6	PCE Concentrations in Groundwater Research Glass vs the Site
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1.0 INTRODUCTION

This report is being submitted to the New Jersey Department of Environmental Protection (NJDEP) to document the historic and current data related to PCE contamination in groundwater in the vicinity of 3740 North West Boulevard, Vineland, New Jersey ("the Property"). The Property formerly was operated by The Fischer & Porter Company, at which time the operating facility was known as the Andrews Glass Company ("the Facility"). ABB, Inc. ("the Company"), through a series of corporate transactions, is the successor to The Fischer & Porter Company. As part of settlement of a lawsuit filed by NJDEP, the Company agreed to collect current groundwater quality data at the Property and provide this report to substantiate that the Property is not a threat to human health or the environment and that the Company's ISRA compliance should be concluded with the issuance of a No Further Action Letter and Covenant Not to Sue. A summary of historical reports submitted to the NJDEP associated with the Property are listed in Attachment A.

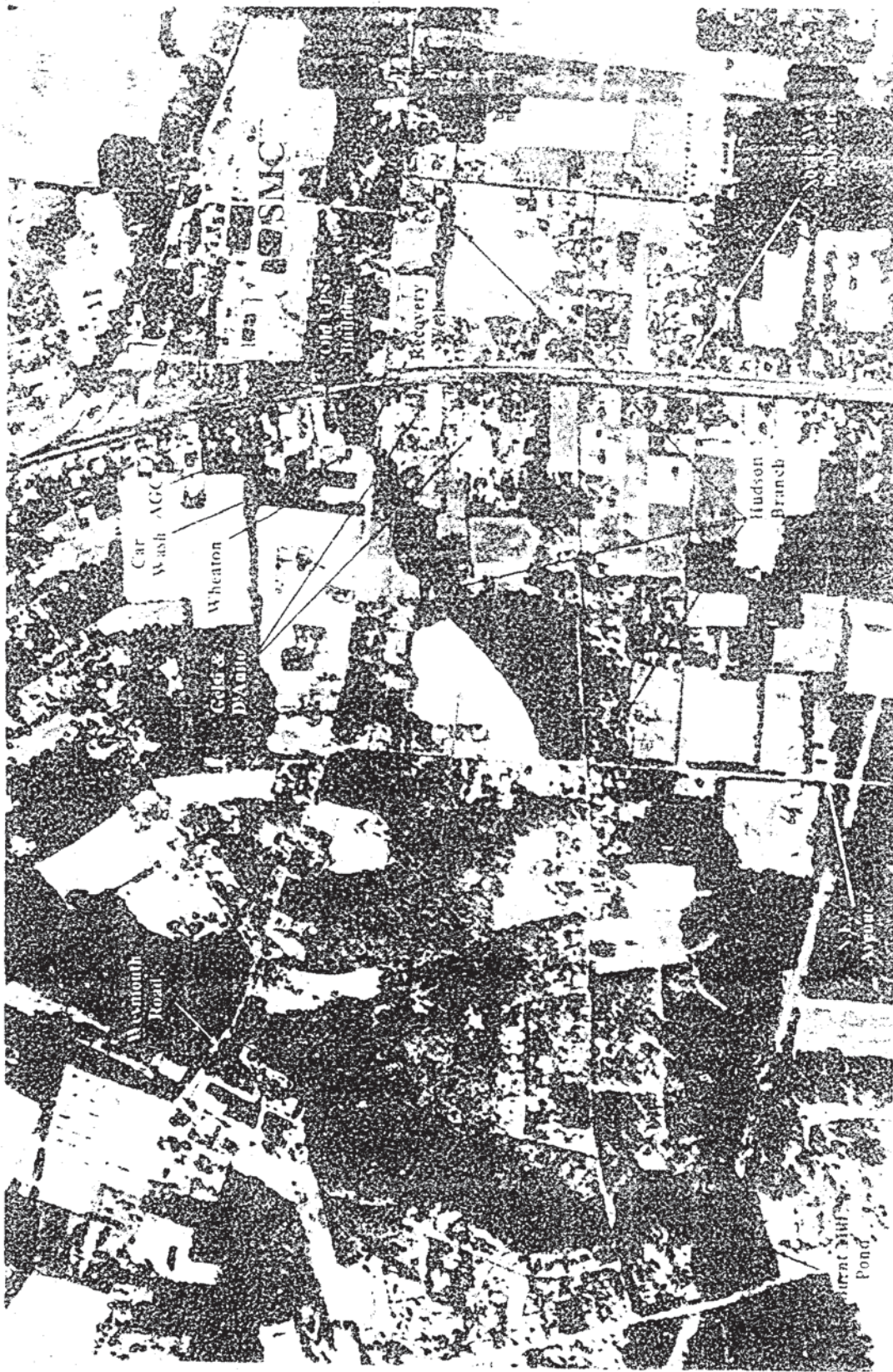
2.0 BACKGROUND

2.1 Site & Surrounding Industry Description

The Property is located in an area of industrial/commercial usage and small businesses in North Vineland, New Jersey near the south end of Newfield Borough (Figure 1). Residential properties are located both up and down gradient, often with a section of the residential property also used for industrial/commercial purposes. Prior to development, property in this area was generally undisturbed wooded land or farmland. Sanitary sewers historically were not and presently are not available, and therefore, properties in this area of North Vineland include one or more on-site septic systems for waste discharge.

The Property is approximately 6.5 acres in size. The landscaped, approximately rectangular manufacturing building at the eastern end of the Property and related paved parking on its northern and southern sides comprise approximately three (3) acres. The rest of the property - the western portion - is composed of a relatively large area of heavily wooded (both evergreen and deciduous trees of substantial height and age) and vegetated unused land. A few years ago, the current property owner cleared a small portion of this area and planted grass to provide a place for employees to eat lunch outside during pleasant weather. The Property is relatively flat as is the entire area, except for an approximately 5-foot decrease in elevation from the Property to what is referred to as the former Wheaton site, which is adjacent at the Property's downgradient boundary.

The Property is located on the west side of North West Boulevard, approximately 500 feet north of the intersection with Weymouth Road (Figure 2). The site is bounded on the north side by Research Glass Company, an unrelated glass manufacturing facility, and property belonging to Shieldalloy Metallurgical Corporation ("SMC").



Aerial photograph of site area with primary features identified.

East of the Property, on the east side of North West Boulevard, is the SMC manufacturing facility. The SMC facility, located on approximately 60 acres, is a large manufacturing plant that since 1955 has been producing steel, specialty and superalloy additives, primary aluminum master alloys, refractory and metal carbides, powdered metal and optical surfacing products. Past and present manufacturing operations generated slag, dross, baghouse dust, sludge and still bottoms, and various wastewaters. Some wastewaters were contained in nine, on-site lagoons.

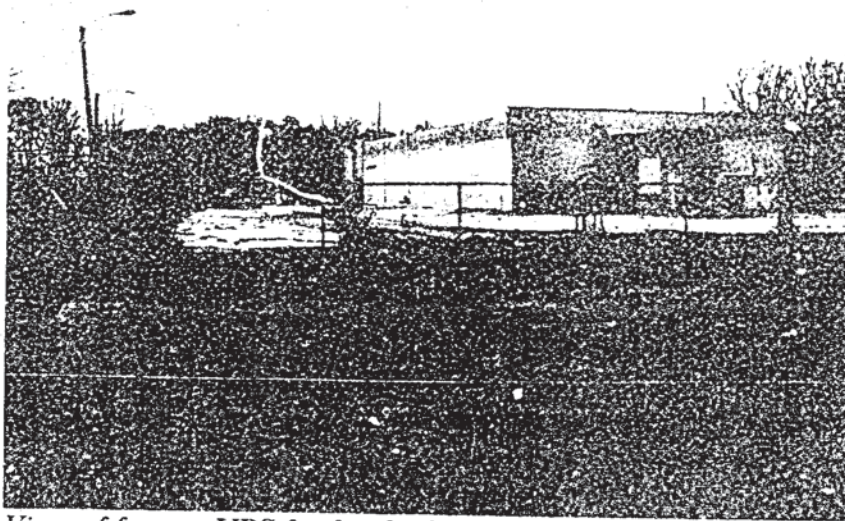
For several years the SMC facility also conducted a degreasing operation in which titanium chips were first immersed in a TCE bath and then, as they emerged from this bath, were rinsed in a flow of clean solvent distillate. Approximately 15 to 20 drums of TCE were required to initially charge the system and make-up solvent was required at about one (1) drum per eight (8) hour period. According to former SMC employees, the floor under the degreaser operation may have been dirt. In conjunction with this degreasing operation, SMC also conducted a TCE and vapor recovery, distillation and water/solvent separator system on site. Aqueous condensate from solvent recovery/regeneration, which would be expected to contained residual quantities of TCE, was discharged to surface drains and the plant's storm sewer. Sludge and still bottoms were manually removed from the equipment and placed in 55 - gallon drums. Water was drained from the water/solvent separators used in the distillation and carbon adsorption regeneration processes via manually operated valves and was discharged to the building's storm sewer lines. (Historical VOC Usage at the SMC, Newfield, New Jersey Facility, August 31, 1988, ERT). At other times, other storage of waste solvents also is documented to have occurred. While there is no documented use of PCE at the SMC manufacturing facility, industrial grade TCE can contain up to 12% PCE, according to industry literature.

Since approximately 1972, the SMC facility has been the focus of a Federal and state Superfund investigation and remediation (a "state lead" site) due to groundwater impacts from metals (principally hexavalent and trivalent chromium) and VOCs (principally TCE) extending in a general plume to the southwest from various on-site source areas. SMC also owns a 7.5 acre parcel located to the southwest of the main facility and the Property, which is generally known as the "SMC Farm Parcel."

Just north of the SMC manufacturing facility is the Marshall Services Company, which has been in operation since 1933. Marshall Services conducts a petroleum fuel-hauling operation. Historically, the company also conducted cleaning of tanker-truck interiors. Waste disposal documentation filed with NJDEP for this property reported waste PCE. Reports of various spills and discharges from Marshall Services' operations have been made to NJDEP. Currently, a Federal investigation is on-going into the cause of a fuel-tanker explosion at the facility in April 2006.

South of and adjacent to the Property, along Northwest Boulevard, is the former United Parcel Service ("UPS") property, which is approximately 1.84 acres in size. This facility, which was conducted between 1965 and 1970, reportedly had underground storage tanks used for solvent storage, according to documents in NJDEP files.

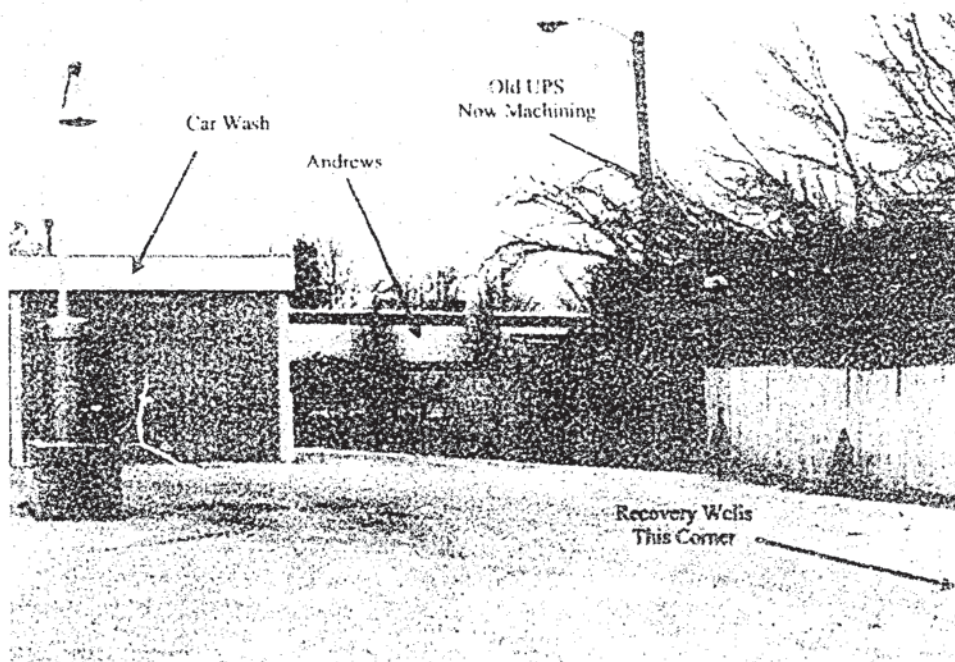
According to a December 1988 report by Dav Raviv Associates, Inc., a 1,000 gallon septic tank and associated leach field reportedly was installed at the UPS facility in Spring 1988 and is located directly east of the building.



View of former UPS facility looking east from boundary between the Property and the NVCW

The earlier septic system reportedly consisted of a 1,000 gallon septic tank and two seepage pits. This earlier system reportedly was located to the north of the system installed in 1988, which would place it closer to the Property. The old system was filled with material, rather than removed, although the type of fill used is unknown. An 8,000 to 10,000 gallon underground gasoline tank was removed in August 1986 from the north side-yard of the site. A 300 gallon waste oil underground tank was removed in August 1987 from the general area where the septic system was installed in 1988. Additionally, four pits used for collection of truck washing liquids were present outside the building, two on the north and two on the south side. The southern pits had been filled in, but the northern pits, which could be examined, were constructed of cinder blocks and were approximately 10 feet deep and 30 inches wide. The northern pits were not far from the area of MW-5 and MW-7 on the Property or the car wash border. It is not known if the northern pits remain or what was used to fill the southern pits.

On the south side of the former UPS facility and adjoining part of the eastern boundary of the car wash and Weymouth Road, is a large wetland area associated with the Hudson Branch stream. This wetland includes ponded, open water varying in size and depth with the seasons, rainfall and other weather conditions. Vegetation and mature trees grow in the wetland.

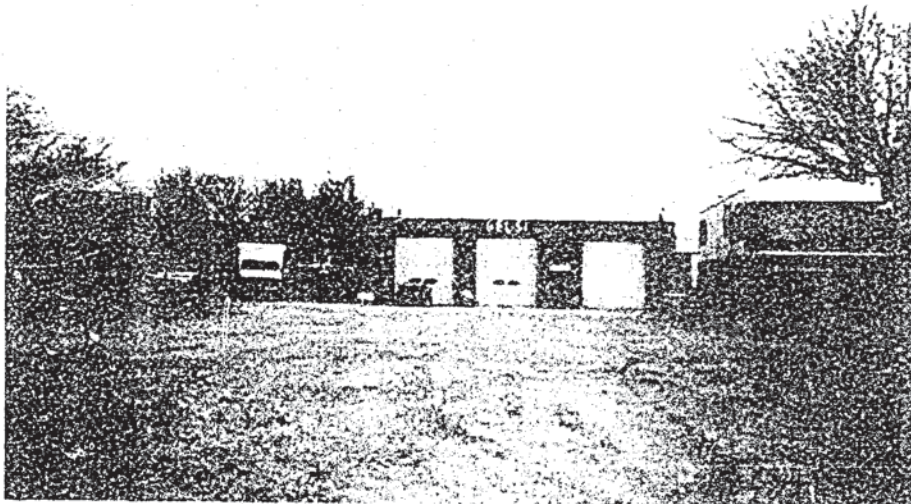


View from the NVCW looking across the former UPS property toward the AGC property.

Southwest of the Property is a coin-operated car wash (the North Vineland Car Wash, "NVCW") that has been in operation since at least 1976. Water is supplied by the municipal water company. No water re-circulation system is in use. No records or physical site evidence indicate production wells were ever in use on site. The rear of the approximately 1.12-acre car wash facility, which rear area is unpaved and vegetated with weeds and scrub brush, borders a section of the Property. The car wash is an unattended, self-serve facility with four car bays and a truck wash bay that discharge through floor drains to earth-bottomed, septic field holding tanks and an on-site septic disposal field. No record or physical indication of an oil/water separator is apparent. A portion of the site's south half area once contained a wetland that has been backfilled. Accumulations of oil and grease have been observed periodically in the drains and septic tanks. The site was subject to removal of such contamination, as well as floating free product and oil-contaminated soils piled in the undeveloped, back section of the site, in 1994, pursuant to a June 1993 Notice of Violation of the New Jersey Spill Compensation and Control Act. Investigation of the site's septic system and potential leach field, soils and groundwater were not adequate, according to NJDEP. (Remedial Investigation Report and Remedial Action Report, North Vineland Car Wash, August 1996, RMI Environmental, Inc., submitted to NJDEP pursuant to a then-existing Memorandum of Agreement and NJDEP file memorandum dated April 1999).

Also to the southwest of the Property is the approximately 2.49-acre, former Galena Lead Crystal facility ("the former Wheaton site"), which borders a section of the Property and the western side property line of the car wash. This site was developed, based on aerial photographs, between 1951 and 1962. Both the car wash and the former Galena Lead Crystal site are accessed from Weymouth Road. The Galena Lead Crystal site was formerly owned by Wheaton Glass Company. Various operations have been conducted

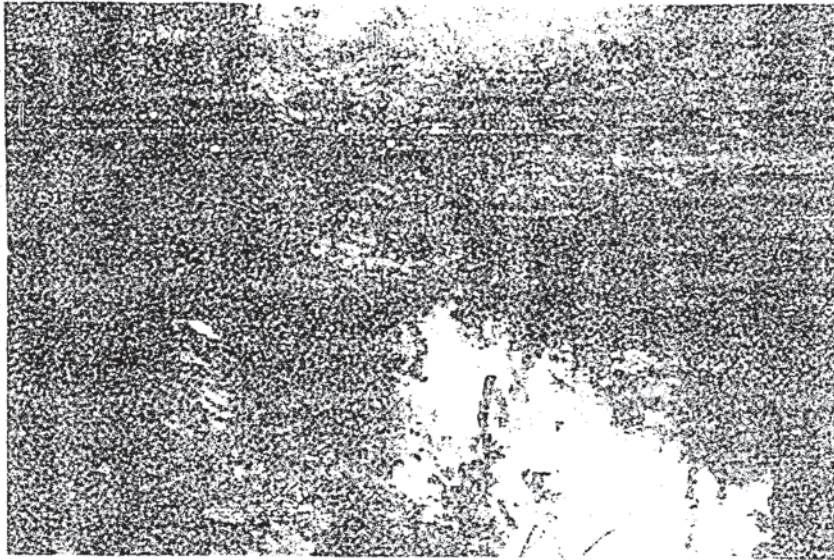
at the facility periodically in the past by Wheaton and other operators. Prior to operations conducted by Wheaton companies, a company known as American Thermoplastics operated at the site from approximately 1965-1969, although nothing appears known about its operations. Several former and current on-site septic systems have been in use and historically, aerial photographs show several lagoons existed on site. Currently, the site includes a seepage pit that collects storm water from building downspouts, as well as a grassy storm water retention basin.



View of Gelsi's Auto property

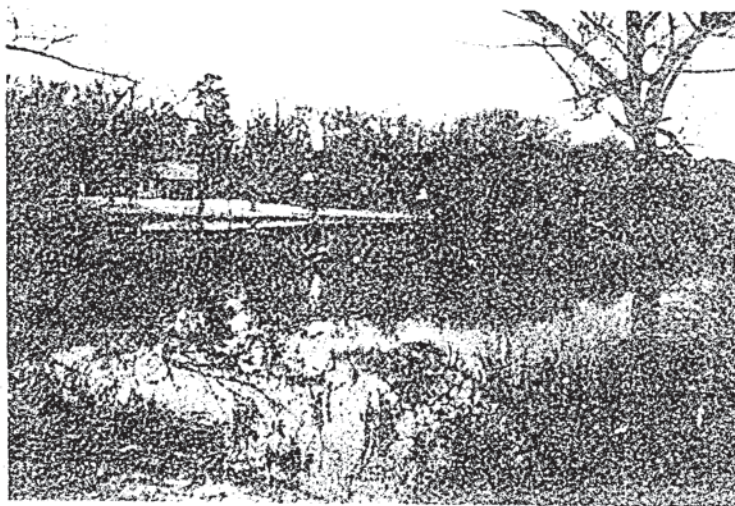
West of the Property is an open area beyond which is located Zip's Garage. Across Weymouth Boulevard south of the Property and before West Arbor Avenue, but on the same side of North West Boulevard as the Property, are Gelsi's Auto and D'auto's Express, both automotive-related operations. Use of unidentified solvents and the presence of waste oil tanks at both of these facilities is reported in NJDEP files from 1986.

Hudson Branch is a small creek near the Property that flows east to west. It consists of a distinct channel in some areas and flow through wetlands in other areas. At some locations, the stream is less than 5-feet wide. The stream, which originates at the southeast corner of the SMC manufacturing site, flows along the southern SMC boundary, past the southern side of the former UPS facility and along Weymouth Road for a short distance to the area of the car wash.



View of the wetlands area associated with Hudson Branch, adjacent to the NVCW

From the area near the car wash, the stream then flows to the southwest through a residential/commercial area that includes a large parcel of land owned by SMC, small businesses, a farm with livestock, and numerous residences. Small ponds and intermittent wetlands are present in some areas. The waters of the stream are supplied by a combination of discharging ground water and storm water. The Hudson Branch is primarily a gaining stream, although during major storm events, it can locally transform into a losing stream and, as a result, the ground water in the vicinity of the Hudson Branch may become mounded, although for a limited duration and with sporadic frequency. (Final Focused Feasibility Study Report Ground Water Remediation, February 1994, TRC Environmental Corporation, on behalf of SMC). The stream discharges to Burnt Mill Branch, which flows from the north. The joined streams then flow into Burnt Mill Pond, a substantial water body, approximately one mile from the Property.



A view of Burnt Mill Pond.

The sparsely developed, residential area consists primarily of single-family homes on relatively large lots, interspersed with farm fields or wooded or otherwise undisturbed areas of natural vegetation. Most of the houses have either separate or attached garages and many have varying types of other outbuildings. Home-based businesses were observed at some locations, such as one that had a sign for a floor cleaning business. This home-based business also existed in 1986, according to NJDEP files. Homes in this area historically and presently discharge waste to on-site septic systems. Prior to approximately 1986, individual potable wells were in use, although municipal water service was available in some areas. After 1986, the municipal water service was expanded to the entire area and, due to a well restriction area imposed by NJDEP, all residents were required to connect to the municipal water system and have their potable wells professionally sealed according to law.

2.2 Site History

Andrews Glass Company, a division of The Fischer & Porter Company, began operations at the Property in 1961, leasing the Property until 1971 when the land was purchased by The Fischer & Porter Company. From 1961 to 1967, operations were limited to the production of various laboratory glassware. Beginning in 1967, production of printed circuit boards was added at the facility. Circuit board production was modified and sometime prior to 1980 was limited to the assembly of pre-printed circuit boards. Both circuit board assembly and glassware operations continued until October 1988 when all of the glass manufacturing at the Facility ceased. In November 1994, the circuit board assembly operations at the Facility were discontinued and the Facility was closed. The Property was sold by The Fischer and Porter Company in August 1996. Current operations are conducted by an unrelated entity and involve certain glassware manufacturing. No industrial discharges occur as part of current operations.

Four wastewater systems formerly were present at the Facility. Two of the systems were for sanitary septic wastes and the other two were industrial wastewater systems. The systems at the eastern and western ends of the facility handled only the sanitary septic discharges from bathroom facilities. Investigation of the sanitary systems documented no unacceptable conditions existed. The northern and southwestern systems were the industrial wastewater systems and were used for discharge of rinse, wash and non-contact cooling waters. The southwestern industrial wastewater system also received discharge from a water fall spray booth used in part of the circuit board assembly operations for application of urethane coating.

After September 1986, all facility discharges to the northern industrial wastewater system, except those discharges consisting solely of non-contact cooling water, were containerized and disposed offsite. Discharges to the southwestern industrial wastewater system were terminated completely.

The discharge of non-contact cooling water from glass operations was discontinued by October 1988, when all glass operations at the facility ceased. This discharge always had

been directed only to the northern industrial wastewater system. After October 1988, only non-contact cooling water from circuit board assembly operations continued to be discharged. By February 1992, the remaining discharge of non-contact cooling water to the northern industrial wastewater system at the property ceased. Therefore, by February 1992, all discharges to all industrial wastewater systems at the property had ceased.

The Facility was issued a New Jersey Pollutant Discharge Elimination System (NJPDES) Discharge to Groundwater (DTG) permit (No. NJ0063797) by the NJDEP in August 1987. In compliance with this permit, the Facility installed 6 monitoring wells at the Property in January 1988 and initiated groundwater monitoring in February 1988. Monitoring well locations were selected in all cases but one by NJDEP. NJDEP agreed to and approved the one location proposed by the Company.

In March 1992 the Company notified NJDEP that all discharges to the industrial wastewater systems had ceased and the Company requested termination of its NJPDES permit. In March 1993, the inactive southwestern and northern industrial wastewater systems were removed and closed in accordance with regulations and under oversight by NJDEP.

The groundwater monitoring program undertaken pursuant to the facility's NJPDES permit indicated the presence of generally low levels of several volatile organic compounds in the groundwater and at a sample collection point in the northern industrial wastewater system. The primary constituent of interest was tetrachloroethene (perchloroethene - PCE).

2.3 PCE Use at the Property

The use of PCE at the Property was limited to vapor degreasing that was part of the acid-etching process performed during manufacturing operations of only certain of the glassware products, those that required application of calibration markings, produced at the Property. As part of the calibration process, the glassware would be coated with wax and the calibration lines and other markings would be scribed into the wax. The glassware was then immersed into a hydrofluoric acid bath, which would etch the markings into the glass, followed by immersion into a liquid soda ash bath to neutralize the acid.

The glassware would then be rinsed with water and placed in baskets composed of pronged racks. The filled baskets were suspended in the vapor zone of an interior containment chamber of a self-contained PCE vapor degreasing unit to remove wax adhered to the glass. This vapor zone was created by heating, via electric heating coils, PCE held in a reservoir near the bottom of the degreaser.

At the culmination of this process, the baskets were slowly raised through a cold trap in the unit. The cold trap consisted of an interior area toward the top of the containment chamber where non-contact cooling water was circulated through piping running around

the outside of the containment chamber (that is, inside the "jacket" of the unit), which created a cold zone or "trap." Upon reaching the cold zone, the PCE vapors condensed into liquid and fell back into the reservoir at the bottom. Glassware was racked in a manner to prohibit entrapment of condensing PCE.

Following this, the glassware proceeded through a clean water rinse and subsequent wash operations. Water from these rinse and wash operations, as well as the non-contact cooling water, was discharged to the northern industrial wastewater system.

In approximately 1970, decals were introduced as a substitution for etching calibrations. The use of decals did not require processing glassware through the PCE vapor degreaser. Because the decal process reduced the cost of manufacturing, post-1970, decal use increased over time and thus, the use of the PCE vapor degreaser decreased.

No spills or releases of pure virgin or waste PCE have been recorded, reported or are known to the Property. Significant quantities of rinse, wash, and non-contact cooling waters that were not in contact with glassware after it first emerged from the vapor degreaser were discharged to the northern industrial wastewater system in connection with other Property processes, as well as part of this particular operation. NJDEP concurred that under such conditions, PCE concentrations in the wastewater system effluent would have remained dissolved. PCE concentrations, if any, would have likely further diluted as the discharge to this industrial wastewater system also consisted of various other, on-going wash, rinse, and non-contact cooling waters. Further attenuation would be expected upon reaching groundwater.

The highest PCE concentration detected in the standing water in the northern industrial wastewater system that received the glassware cooling/rinse water effluent (NJPDES sample point MO-2) was 2.2 mg/kg (ppm) in March 1988. All other concentrations detected at this location were significantly lower. NJPDES samples were collected from the standing water in the collection sump because the end of the discharge pipe was inaccessible. When the March 1988 sample was collected, only a small amount of standing water was present and it is possible that this concentration reflects PCE that had been adsorbed to the settled solids and then re-dissolved into the standing water.

The highest PCE concentration detected at MW-2, MW-3 or MW-6 in any groundwater sampling events was 84 ug/l (ppb) in MW-2 in October 1988. PCE was not detected in most of the groundwater samples, and since January 1989, concentrations did not exceed 14 ppb (except MW-7). Concentrations demonstrated a decreasing trend over time after cessation of all industrial discharges to, and particularly after closure and remediation of, the northern industrial wastewater system. Further discussion of the industrial wastewater systems, their closure, the NJPDES monitoring and the decreasing trend of PCE concentrations is provided in various reports previously filed with NJDEP, including, but not limited to, the August 6, 1997 Groundwater Delineation Investigation Report prepared by McLaren, and in discussion of the results of a Mann-Whitney U Test previously submitted to NJDEP.

In response to the routine groundwater monitoring results, industrial wastewater system closure and ISRA compliance obligations, numerous significant investigation tasks have been performed at the site. These tasks included, but were not limited to: analysis of sludge, sediment, and water samples from both industrial wastewater systems, a soil vapor survey, collection and analysis of soil samples, obtaining groundwater samples by Hydropunch, installation and sampling of additional monitoring wells in addition to activities conducted under the NJPDES permit, review of data related to various other properties in the area, and evaluation of other data from various other sources. A significant review of NJDEP files was performed to obtain available data from investigations performed at other sites in the area around the facility. This review included, but was not limited to, data from the Shieldalloy Metallurgical Corporation (SMC) site, the manufacturing site of which is located upgradient of the Property and is included on the National Priority List (NPL) and the SMC Farm Parcel, which is located downgradient of the Property; Wheaton/Galena Glass, which is adjacent and down gradient of the Property; and the North Vineland Car Wash, also adjacent and generally down gradient, or slightly side gradient, to the Property. Most recently, a 2005 report prepared by NJDEP concerning the agency's investigations and historical record review of the NVCW and former Wheaton sites ("the 2005 NJDEP Report") was reviewed.

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Significant remedial tasks also have been performed at the Property in order to remove any potential onsite contamination sources. During the 1993 closure and remediation of the industrial wastewater discharge systems, any potential sludge in the discharge systems was removed and the components of the discharge systems were excavated and removed. After completion of the remediation, thirty post-excavation soil samples were collected to document the satisfactory removal of any potentially contaminated materials. Later, as part of ISRA compliance, additional confirmatory post-excavation samples were collected and analyzed. By letters dated May 15, 1995 and March 12, 1996, NJDEP approved no further action regarding site soils. At a March 24, 1999 meeting, NJDEP again concurred that the industrial wastewater systems were satisfactorily closed and that there are no remaining potential sources of on-site contamination related to property soils.

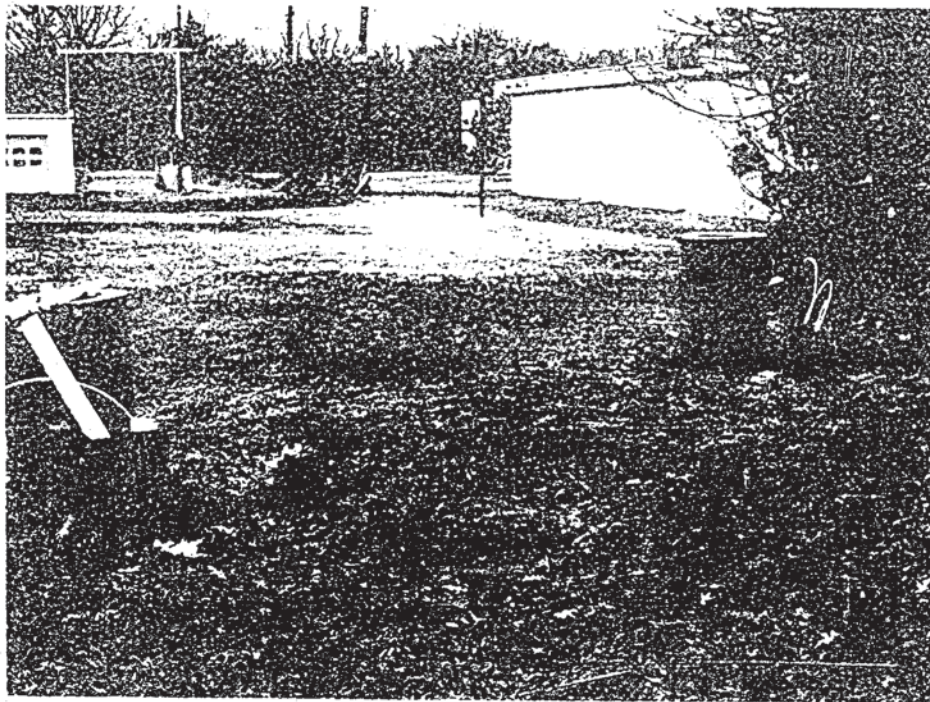
3.0 PCE OCCURRENCE IN GROUNDWATER

Provided in the sections below are summaries of the current and historical groundwater data representing upgradient and downgradient conditions in relation to the Property. A discussion of the groundwater flow pattern in the vicinity of the Property also is provided. For the purposes of this report, the groundwater discussion has been divided into two sections: one addressing groundwater conditions in the up gradient area and at Property monitoring wells MW-2, MW-3 and MW-6, which were installed to monitor groundwater conditions down gradient of the Facility's northern septic system, and the other discussing groundwater quality at Property monitoring wells 5 and 7 at the down gradient Property edge and areas further downgradient.

As requested by NJDEP, current groundwater quality data was collected for the Property.

Groundwater samples were collected from five (5) monitoring wells on the Property on December 15, 2005. The wells sampled were MW-2, MW-3, MW-5, MW-6, and MW-7 (Figure 2).

The wells placed to monitor the northern septic system are: MW-2, which is located closet to the former system's location; MW-3, which is down gradient from MW-2, and MW-6, which is located down gradient from MW-3 and approximately 100 feet from the Property's down gradient boundary. Wells MW-5 and MW-7 are located proximate to the former southwestern industrial septic system. These two wells are only approximately 17 feet apart, with MW-7 being down gradient of MW-5 and being located directly on the down gradient Property line.



View of wells MW-5 (left) and MW-7 (right) looking south from the Property toward the NVCW and former Wheaton sites.

The groundwater samples were collected by Sigma Environmental Services, Inc. Depth to water in each well was measured using an electronic water level probe and the volume of standing water was calculated. A small submersible pump with dedicated discharge tubing was used to purge the standing water in the well. All purge water was contained in steel 55-gallon drums for potential offsite disposal. During purging, pH, conductivity, and temperature were measured to determine when purging was complete. Between three and five casing volumes were purged from the wells. Purging ceased when either five casing volumes had been purged or the field parameters had stabilized.

After purging was completed, groundwater samples were collected using disposable Teflon bailers. Purge and bail sampling was performed to maintain consistency with the historic groundwater sampling events. The groundwater samples were placed directly in laboratory prepared vials that were preserved with hydrochloric acid. The samples were

placed in an iced cooler during completion of sampling and transport to the laboratory. Chain-of-custody documentation was maintained for the samples. The samples were analyzed for PCE at QC Laboratories, Inc. in Southampton, Pennsylvania. In addition to the groundwater samples, a trip blank and field duplicate also were analyzed for PCE. Dissolved oxygen measurements also were performed using a flow through cell and a Horiba U-22 meter during the sampling as discussed with NJDEP. Results of these analyses are discussed in the sections below. Copies of the sampling record forms, including the dissolved oxygen data are included in Attachment B.

3.1 Groundwater Flow

The aquifer immediately underlying the site is the Cohansey Formation, which is comprised dominantly of sand. Subsurface data from the adjacent SMC site indicated that there are some thin, discontinuous clay/silt layers which separate the Cohansey into the upper and lower zones. The discontinuous nature of these layers is believed to result in only a minor hydraulic separation of the two zones. Boring logs generated for the SMC Remedial Investigation (RI) indicated that the upper Cohansey is composed of coarse sands, while the lower Cohansey consists more of finer sands and some silt. Aquifer pumping tests performed at the SMC site indicated that there was a significant difference in transmissivity between the upper and lower zones. The lower zone exhibited a significantly lower transmissivity than the upper zone. Although there is not a significant aquitard present, the different permeabilities of the two zones results in potential differences in groundwater flow, particularly the flow rate. The boundary between the upper and lower zones was generally at a depth of between 75 and 100 feet.

The Cohansey Formation is underlain by the Kirkwood Formation, which is characterized by a thick gray/black clay at the contact with the Cohansey. This clay zone represents a significant aquitard, which would serve as a lower boundary to groundwater flow in the Cohansey. The top of the Kirkwood, as identified by the thick gray/black clay, was found generally at a depth greater than 100 feet, according to the data obtained during the investigations performed at the SMC site.

Shallow Groundwater Flow

Groundwater flow in the shallow aquifer zone at the site historically has been consistently toward the southwest (Figure 3). The monitoring well locations also are shown on Figure 3. The data collected from the onsite wells has been very consistent with the potentiometric maps generated as part of the Remedial Investigation/Feasibility Study (RI/FS) at the SMC site and later groundwater monitoring events. The only variant or anomaly in the groundwater flow pattern has been observed at wells MW-5 and MW-7. The head at well MW-7 has generally been lower than at MW-5 as would be expected for the site-wide pattern of groundwater flow toward the southwest. Based on the locations of these wells, which are approximately 17 feet apart, and the relatively low hydraulic gradient across the site (.0019), the head difference between these wells would be expected to be negligible. However, on at least two occasions (February and April

1995) the potentiometric data has indicated a reversal where the head is almost one foot higher in well MW-7 than MW-5.

It has been determined that the likely cause of this anomaly is mounding associated with shallow discharges at the adjacent car wash and conditions at the adjacent Wheaton property. Conditions at the former UPS facility also may somewhat contribute. A detailed discussion of this is provided in Section 3.3.5.

Comparison of the heads in the two wells in relation to the natural gradient across the site indicate that it is extremely unlikely that the potentiometric data reversal is caused by a natural hydrogeologic phenomenon. There were no geologic differences identified in the logs for wells MW-5 and MW-7 and both wells are constructed in the same manner, in the same aquifer zone. Both of the wells are at locations where the surface features are the same (i.e. neither well is located in a depression or other location where natural conditions would tend to enhance recharge resulting in an elevated head). There is no indication that well construction defects, such as annular space grout problems, are a potential cause of the anomaly.

Based on the location of wells MW-5 and MW-7 directly adjacent to the Facility property line, onsite and offsite cultural features were reviewed for possible effects on the potentiometric surface at the wells. No onsite discharges, drain fields, pipelines, or similar features could be identified in the vicinity of the two wells.

The self-serve, North Vineland Car Wash and the former Wheaton Industries/Galena Lead Crystal site abut the Property at the location of the anomalous wells. The back boundary of the former UPS facility meets the side yard of the car wash in this general area also. The car wash has a septic tank and drain field that extends from the back (north side) of the building directly toward the well pair (Figure 4). Exact limits of the extent of the actual drain field have not been substantiated in the field. NJDEP had requested an investigation by the car wash owners, but these activities were never conducted. However, based on the records from the Vineland Department of Health, the drain field appears to exist in close proximity to the well pair. It is possible that discharges from the drain field may result in periodic, localized groundwater mounding near well MW-7. Additionally, a perimeter drain system for roof and stormwater runoff was observed on the former Wheaton site. This drain system passes the corner of the property, that is closest to well MW-7. It is also possible that flow in this system may result in periodic, localized groundwater mounding near well MW-7. Available figures also show that the drain field from the eastern septic system at the former Wheaton site (Figure 5) extended northward toward well MW-7.

The potentiometric maps included in the Final Focused Feasibility Study (FFFS) for the SMC site do not appear to indicate an influence from SMC recovery wells located at the southeast edge of the car wash, along Weymouth Road, in the shallow zone at the Property. However, data from the former Wheaton site indicated that influence of these recovery wells in the shallow zone extended across the Wheaton site. A report prepared for Wheaton stated that 1989 pumping tests on the SMC RW-6 wells resulted in

drawdown in the shallow wells on the Wheaton site. This data would indicate that under those pumping conditions, the shallow groundwater passing beneath the Property would be captured by the SMC recovery wells as this groundwater flows to the Wheaton site.

Deep Groundwater Flow

Based on the potentiometric data collected for the SMC RI/FS, the flow in the deep aquifer zone in the Cohansey Formation is generally consistent with the shallow zone, except for the influences from the SMC groundwater recovery system. The potentiometric contour maps included in the Final Focused Feasibility Study (FFFS) for the SMC site indicate that groundwater in the deep zone passing beneath the Property is captured by the SMC RW-6 recovery wells. The inferred capture zone for these wells, presented in the SMC FFFS includes all of the Property (Attachment C).

3.2 Upgradient Groundwater Data

3.2.1 SMC

The Shieldalloy Metallurgical Corporation (SMC) site located east and northeast of the Property was designated a National Priority List or Superfund Site due to the presence of extensive contamination by volatile organic compounds (VOC) and metals. A large VOC plume extends from the SMC site toward the southwest. As stated previously, large volumes of trichloroethene (TCE) were documented to have been used at the SMC facility. Typically, tetrachloroethene/perchloroethene (PCE) occurred as an impurity in industrial grade TCE, composing as much as 12% of the product, according to industry literature. Although PCE was not detected extensively in groundwater at the SMC site, it did occur at low concentrations in a well located near the western side of the SMC property (W9). PCE represented 8.2% of the total VOCs detected in this well. Well W9 is a deep pumping well located on the SMC site, upgradient from the Property.

Low PCE concentrations also were found in soils directly under a failed liner of one of the SMC waste water lagoons, which initially had been operated without a liner. Soil concentrations detected after over excavation of obviously contaminated materials exhibited PCE concentrations up to 81 ppb (SB-7-18). PCE was also detected in SB-7-11 and its field duplicate SB-7-21 at concentrations of 63 and 73 ug/kg, respectively.

Although well W9 is a deep pumping well, potentiometric data indicates that the capture zone for this well does not extend to the Property. This well is upgradient of the Property and thus this data indicates that, since the PCE detected in this well would not have originated from the Property, there is or was a source of PCE on the SMC site or upgradient of the SMC site. It is also possible that relatively low concentrations of PCE were present in some SMC wells but were masked due to high TCE concentrations and associated sample dilutions.

3.2.2 Marshall Services

Just north of the SMC facility is the Marshall Services Company, which has been in operation since 1933. Waste disposal documentation filed with NJDEP for this property reported waste PCE.

PCE was detected at a concentration of 2.6 ug/l in a supply well at 19 Catawba Ave (Figure 1) on May 8, 1986 during sampling performed by NJDEP. This location is north of the SMC facility and northeast of the Property.

As this location is significantly upgradient of the Property, as well as up gradient of the SMC facility, it is indicative of a more pervasive occurrence of PCE throughout this general area. Although this area could serve as a source of groundwater contamination with the potential to travel to the Property, it is not possible to determine the significance as no more recent data for this area has been located.

3.2.3 Research Glass

The Research Glass property is directly adjacent to the upgradient side of the Property. Due to a discharge from its industrial operations to the septic system, NJDEP required installation of a monitoring well and compliance with an NJPDES permit. Research Glass and the Facility were ordered to install monitoring wells and commence sampling at nearly the same time. Research Glass, however, strenuously objected to being required to undertake NJPDES compliance and delayed well installation, as well as initiation of monitoring. Due to this delay, Research Glass data does not begin until more than 18 months after the first Property groundwater data was generated. Subsequently, due to the presence of soil contamination under a gasoline underground storage tanks (UST) at Research Glass, NJDEP required the installation of another monitoring well to assess the impact to groundwater from gasoline components.

Research Glass installed the NJPDES monitoring well on the south side of the building. Well MW-1 was installed at the southwest corner of the building near the seepage pits associated with the Research Glass septic system. Well MW-2 was installed a few years later approximately 42 feet northeast of MW-1, near the side of the building where a gasoline UST was removed. MW-1 was sampled from January 1989 through July 1997. MW-2 was sampled from January 1991 through January 1992. A summary of the PCE concentrations detected in these wells is provided in the table below:

RESEARCH GLASS GROUNDWATER DATA		
WELL	DATE	PCE CONCENTRATION ug/l
MW-1	3/21/89	7
	10/4/89	1
	2/15/90	20
	11/8/90	12.45
	1/31/91	18.8
	6/5/91	1
	1/20/92	177.49
	6/29/92	59
	12/29/92	80
	6/14/93	100 K
	2/21/94	29
	7/21/94	13
	7/27/95	22.9
	12/18/95	32.4
	7/22/96	5 K
	1/8/97	16.5
	7/29/97	10 K
MW-2	1/3/91	1.0 K
	6/29/92	5.0 K

K - Estimated concentration

Research Glass was required to sample its NJPDES well only two times a year, thus limiting the data available. Additionally, NJDEP records document that at various times sample episodes were missed, certain analytical parameters were omitted, and minimum detection levels were significantly higher than NJDEP groundwater quality standards. All of the above create gaps in the Research Glass groundwater data and it therefore cannot be determined if PCE concentrations were higher in between noted sampling events or if a particular trend existed. For example, if PCE concentrations were related to an irregular, although periodic, discharge, actual concentrations in the groundwater closer in time to the discharge event may have been higher than recorded values. The frequency of the discharge also could have influenced contaminant concentrations. Research Glass did not directly explain why PCE was being detected during its NJPDES sampling, other than to say it would no longer allow the contractor that refurbished its grinding wheels to conduct that operation at the Research Glass site. In any event, why PCE was present in groundwater at Research Glass is of less importance to the Company than the fact that from 1990 forward, groundwater upgradient of the Property contained PCE concentrations that routinely exceeded, and sometimes substantially exceeded, concentrations monitored in Property groundwater.

A graph showing the PCE concentrations in Research Glass well MW-1 in comparison to Property well MW-2 is provided as Figure 6. As shown on the graph, the PCE

concentration in Research Glass well MW-1 was consistently higher than Property well MW-2 which is side-gradient of the Research Glass well. Notably, discharge to the northern industrial wastewater septic system at the Property had ceased by March 1992 and the systems were removed by March 1993. Thus, the PCE concentrations in Research Glass well MW-1 are indicative of a source unrelated to the Property.

In addition to PCE, significant concentrations of lead, benzene, toluene, ethyl benzene, and xylene (BTEX) were detected in groundwater samples from Research Glass well MW-1. The source of the lead and BTEX was likely the gasoline UST that had been located on the Research Glass property. A graph of the BTEX concentrations is provided as Figure 7. The presence of BTEX compounds in groundwater in this area would have impacted certain aquifer characteristics, such as dissolved oxygen, as these constituents underwent natural attenuation.

3.2.4 Historic Site Data

The Facility was issued a New Jersey Pollutant Discharge Elimination System (NJDES) Discharge to Groundwater (DTG) permit (No. NJ0063797) by the NJDEP in August 1987. In compliance with this permit, the Facility installed 6 monitoring wells at the facility in January 1988 and initiated groundwater monitoring in February 1988. A summary of the PCE data from Facility monitoring wells MW-1, MW-2, MW-3, and MW-6 (21 quarters) is provided in the table below.

ANDREWS GLASS GROUNDWATER DATA				
PCE (ug/l)				
DATE	MW-1	MW-2	MW-3	MW-6
2/17/88	ND	6	28	ND
5/12/88	ND	3 J	10	ND
7/12/88	ND	48	10	ND
10/4/88	ND	84	21	1 J
1/17/89	ND	ND	ND	ND
4/19/89	ND	4	3	ND
7/21/89	ND	2 J	ND	2 J
10/19/89	ND	8	2 J	ND
1/23/90	ND	ND	7.6	ND
4/25/90	ND	ND	ND	ND
7/8/90	ND	ND	3.9	ND
10/4/90	ND	5.1	9.9	ND
1/29/91	ND	4 J	ND	0.8 J

ANDREWS GLASS GROUNDWATER DATA (Contd.)				
PCE (ug/l)				
DATE	MW-1	MW-2	MW-3	MW-6
4/8/91	ND	6	0.9 J	0.5 J
7/16/91	ND	4 J	3 J	ND
10/16/91	ND	6	21	1 J
1/21/92	ND	3	14	4 J
4/30/92	ND	6	ND	3 J
7/2/92	ND	ND	ND	ND
5/3/94	ND	2	ND	ND
2/14/95	ND	9	ND	ND

J - Estimated concentration

MW-2 was situated closest to the northern septic system leach fields. MW-3 is located down gradient of MW-2. MW-6 is located approximately 130 feet down gradient of MW-3 and 100 away from the down gradient Property line. No concentrations of PCE or its known degradation products were detected in MW-3 after January 1992 (four additional sampling events). Groundwater at MW-6 showed no concentrations of PCE, except in estimated concentrations, in any sampling event and concentrations were reported at non-detect after April 1992.

A graph comparing the PCE concentrations in Property wells and Research Glass well MW-1 is provided as Figure 6. PCE concentrations at the Property were routinely lower than the concentrations detected in Research Glass groundwater.

3.2.5 Current Property Data

Groundwater samples were collected from wells MW-2, MW-3, MW-5, MW-6, and MW-7 at the Property on December 15, 2005. As approved by NJDEP, these samples were analyzed for PCE only. Locations of the monitoring wells are shown on Figure 2. The results for wells MW-2, MW-3, and MW-6 are discussed in this section as they are located within the central and upgradient sides of the site and were located to monitor groundwater flowing through the area of the former northern industrial waste water septic system. Wells MW-5 and MW-7, which are located at the down gradient property boundary, are discussed in Section 3.3 in connection with conditions at the adjacent properties that are affecting these wells.

As shown in the table below, in December 2005, PCE was only detected in well MW-2 at a concentration of 1.50 ug/l. This concentration is only slightly above the NJDEP criteria of 1.0 ug/l and is well within the range of concentrations previously documented in off-site wells upgradient of the Property.

WELL IDENTIFICATION	DECEMBER 2005 PCE CONC. (ug/l)
MW-2	1.50
MW-3	ND
MW-6	ND

As PCE was not detected in wells MW-3 and MW-6 and had not been detected in these wells during the last several years that routine monitoring was performed (1992 - 1995), there has not been any notable PCE present in groundwater as it moves from MW-2 across the Property for more than 10 years. Additionally, based on data from MW-6, it can be concluded that during the period that groundwater monitoring has been conducted at the Property, including the most recent sampling event, PCE concentrations in groundwater at MW-2 and/or MW-3 have acceptably attenuated prior to reaching the Property boundary.

3.2.6 Upgradient Conclusions

Based on a review of NJDEP files it was determined that there were and/or are several sources of PCE contamination in the groundwater upgradient from the Property. These are documented by PCE concentrations detected in a well on Catawba Avenue, northeast of the property, the PCE concentrations detected periodically in SMC monitoring wells, and the PCE concentrations detected at the Research Glass site north of the Property.

Although Research Glass did not admit to use of PCE onsite, groundwater data from wells installed to monitor the wastewater system and a former UST at Research Glass indicate that groundwater at this Property was contaminated with PCE and BTEX contamination. No data on current conditions was found in NJDEP records.

The PCE concentrations detected in Research Glass well MW-1 were routinely higher than the concentrations detected in Property well MW-2. Critically, some of the highest PCE concentrations detected in Research Glass groundwater occurred after the Facility remediated the wastewater system. PCE in groundwater at Research Glass continued after all operations at the Property ceased. This underscores the conclusion that a PCE source existed that was unrelated to the Property. No records of any investigation or remediation of potential sources causing or contributing to the PCE concentrations in Research Glass groundwater was found in NJDEP records. There also were no records indicating that any investigation into the PCE detected in the well on Catawba Avenue was conducted.

The Company has undertaken numerous actions to investigate and remediate potential sources of PCE on the Property. The results of these actions indicate that the northern industrial wastewater septic system was the only potential source of PCE on the site. All discharges to this and the southern system were ceased and the industrial wastewater systems were excavated, with the excavated materials disposed offsite nearly 13 years

ago. Post-excavation sampling confirmed that remedial actions met the most stringent NJDEP criteria.

Most importantly, current groundwater data from the Property indicates that there are no PCE concentrations present that justify any further remedial activity or monitoring. The trace concentration detected in well MW-2 in December 2005 may be representative of a minor residual impact from some undetermined upgradient source.

3.3 Downgradient Groundwater Data

Although the general groundwater flow pattern in the area is from northeast to southwest, hydrogeologic conditions at the southern property boundary indicate that features on the adjacent properties to the south have resulted in local variations to the flow direction. This is discussed in Section 3.3.5 below. PCE contamination observed at Property wells MW-5 and MW-7, which are located adjacent to and on the Property boundary, are not attributable to Property conditions, but instead reflect conditions on the adjacent properties. Provided in this section is a discussion of the Property and offsite data from this area.

3.3.1 Historic Site Data

As stated in Section 3.2.4 groundwater monitoring was initiated at the Property in February 1988. A summary of the PCE data from the AGC monitoring wells MW-4, MW-5, and MW-7 is provided in the table below. MW-4 is considered generally up gradient of MW-5, located to the northeast of MW-5. MW-7, located approximately 17 feet east of MW-5, is the most down gradient of the trio and was installed on the Property line.

ANDREWS GLASS GROUNDWATER DATA			
PCE (ug/l)			
DATE	MW-4	MW-5	MW-7
2/17/88	ND	ND	NT
5/12/88	ND	ND	NT
7/12/88	ND	ND	NT
10/4/88	ND	ND	NT
1/17/89	ND	ND	NT
4/19/89	ND	ND	NT
7/21/89	ND	ND	NT
10/19/89	ND	ND	NT
1/23/90	ND	ND	NT
4/25/90	ND	ND	NT

ANDREWS GLASS GROUNDWATER DATA (Contd.)			
PCE (ug/l)			
DATE	MW-4	MW-5	MW-7
7/6/90	ND	14	NT
10/4/90	ND	ND	NT
1/29/91	ND	6	NT
4/8/91	ND	3 J	NT
7/16/91	ND	4 J	NT
10/16/91	0.2 J	1 J	NT
1/21/92	ND	1 J	NT
4/30/92	ND	ND	NT
7/2/92	ND	ND	NT
5/3/94	ND	8	NT
2/14/95	ND	ND	92

J - Estimated concentration

Monitoring well MW-7 was installed after completion of six (6) temporary well points that were installed along the downgradient property line using a GeoProbe™ (Figure 2). Groundwater samples from temporary well points GP-2 and GP-3 exhibited PCE concentrations of 15 ug/l and 180 ug/l, respectively at a depth of 23 to 25-feet below grade. These two samples also contained TCE at concentrations of 26 ug/l and 10 ug/l, respectively. Other samples collected from GeoProbe™ locations further up gradient (further into the Property interior) reported a continued significant decrease in contaminant concentrations. Because the GP-2 and GP-3 property-line TCE and PCE concentrations were generally higher than those detected on the Property, and since concentrations decreased significantly over short distances up gradient and more interior to the Property, this data is more indicative of offsite conditions.

Subsequently, monitoring well MW-7 was installed between temporary well points GP-2 and GP-3 to permit further monitoring of groundwater quality at the property line. As shown in the table above, the PCE concentration detected in well MW-7 in January 1995 was 92 ug/l. During this same sampling event PCE was not detected in well MW-5 located approximately 17-feet east, and further up gradient, of MW-7. The rapidly diminished contaminant concentrations over a very short distance in the up gradient direction and further towards the interior of the Property indicates a localized source off-site for the PCE and TCE in well Property well MW-7. PCE concentrations in MW-4 were consistently reported as non-detected (one event estimated concentrations at 0.2 ppb), indicating that the source was not located in this direction.

3.3.2 Historic Offsite Data

Potential offsite sources of PCE have been identified in the area directly adjacent to the southern Property boundary. These include principally the former Wheaton facility and the North Vineland Car Wash.

Various groundwater and soil investigations previously were performed on the former Wheaton property in the mid- to late 1980's and early 1990's. These historical investigations included monitoring well installation, groundwater sampling, a soil vapor survey, and soil sampling. Several industrial wastewater systems had been utilized at the former Wheaton facility, including several lagoons near the northeast corner of the building. There is no documentation as to how these lagoons were closed, other than aerial photographs showing that they were filled in by 1974. Two septic systems also had been present at the site, including a southern system and an eastern septic system. The eastern septic system was removed in 1990. Samples of sediment from the units associated with the eastern septic system indicated high levels of VOCs, including PCE. Sediment samples from the eastern septic system had total VOC levels as high as 482,600 ug/kg, with PCE levels as high as 2,920 ug/kg. Total VOC concentration in the southern septic system was reported at 17,545 ug/kg, although PCE was not detected in the southern septic system. The primary other compounds detected in the septic systems included, TCE, 1,1-DCA, 1,1,1-TCA, and the BTEX compounds.

In January 1989, a soil vapor survey was conducted on the Wheaton Property that included a total of 38 sampling locations. A map showing the vapor sampling locations and a table with the results are provided in **Attachment D**. The samples apparently were tested for TCE, PCE, DCE, and Toluene. The detection limit is listed as 10 ppb. PCE was detected in four of these samples at concentrations ranging from 33 to 175. The highest concentration was detected in sample No. 8, which was located at the northeast corner of the building, a short distance from the Property and MW-7. A summary of the PCE concentrations detected in the vapor samples is provided in the table below:

PCE CONCENTRATION IN SOIL VAPOR SAMPLES (1989)		
WHEATON SITE		
SAMPLE NUMBER	PCE CONCENTRATION	SAMPLE LOCATION
8	175	Northeast corner of building
11	36	East side of building, former septic
21	77	West side of building near propane storage
28	33	Location to west of No. 21

The distribution of PCE in the soil vapor samples appears to be representative of separate potential sources in the soil and not a reflection of groundwater conditions.

A summary of the PCE concentrations detected in the Wheaton monitoring wells is provided in the table below:

WHEATON GROUNDWATER DATA								
PCE (ug/l)								
DATE	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7	MW-8
4/88	160	8.1	24	180	ND	NT	NT	NT
7/88	35	10	ND	ND	ND	NT	NT	NT
10/88	ND	ND	80	6.8	ND	NT	NT	NT
1/89	ND	ND	11	37	ND	NT	NT	NT
4/89	ND	ND	ND	ND	ND	NT	NT	NT
7/89	ND	ND	14	ND	ND	NT	NT	NT
10/89	ND	ND	12	ND	7.5	NT	NT	NT
1/90	ND	ND	5.5	ND	ND	ND	190	8
2/90	ND	ND	ND	ND	ND	NT	NT	NT
4/90	ND	ND	24	ND	ND	NT	NT	NT
7/90	58	50	14	ND	ND	NT	NT	NT
10/90	ND	ND	ND	ND	ND	NT	NT	NT
1/91	ND	24	ND	8.4	ND	NT	NT	NT
4/91	ND	32	18	ND	ND	NT	NT	NT
7/91	84	51	27	ND	ND	NT	NT	NT
10/91	1.5	9.5	93	32	ND	NT	NT	NT
1/92	55	11	43	242	ND	NT	NT	NT
4/92	23	6.8	28	86	ND	NT	NT	NT

A graph comparing the PCE concentrations in the monitoring wells at the Property with those in the Wheaton wells is included as **Figure 8**. This graph clearly illustrates that the PCE concentrations were significantly higher on the Wheaton property throughout the monitoring period. These data, in conjunction with the sediment data from the Wheaton septic system and the soil vapor data, are strongly indicative of a PCE source on the former Wheaton property.

3.3.3 NJDEP Report Summary

In 2003-2004, NJDEP itself performed a review of historic conditions and additional soil and groundwater testing at the North Vineland Car Wash and the former Wheaton property, issuing a report of the investigation and its finding in 2005 ("the 2005 NJDEP Report"). Based on the 2005 NJDEP Report, groundwater samples were collected at the North Vineland Car Wash in September 2003 using hydraulic push points. Several piezometers also were installed by NJDEP at this time to assess the groundwater flow direction. In April 2004 soil samples were collected in the area of the former eastern septic system at the former Wheaton site along with groundwater samples, and surface water/sediment samples from the Hudson Branch adjacent to the car wash and former Wheaton properties.

NJDEP collected a total of fifty (50) groundwater samples from the Car Wash property in September 2003 and analyzed them for VOCs. PCE was detected in 22 of these samples

as summarized in the table below. A figure showing the sampling locations is included in Attachment E.

PCE DETECTED IN GROUNDWATER – NORTH VINELAND CAR WASH NJDEP STUDY SEPTEMBER 2003			
SAMPLE IDENTIFICATION *	PCE RESULT ug/l	SAMPLE IDENTIFICATION *	PCE RESULT ug/l
GW5B - 20	0.46	GW15B	2.84
GW8B - 20	194.41	GW15C - 32	85.57
GW8C - 28	414.78	GW16B - 20	17.22
GW8D - 36	4.44	GW17B - 20	8.95
GW9B - 20	34.65	GW18B - 20	5.3
GW10B - 20	33.09	GW19B - 20	157.16
GW11B - 20	1.26	GW20B - 20	63.03
GW12B - 20	45.64	GW21B - 20	271.5
GW13B - 20	0.8	GW22B - 20	8.52
GW14B - 20	145.21	GW23B - 20	165.1
GW14C - 32	0.3	GW24B - 20	71.83

* Last two digits in sample identification represent depth below grade in feet.

The most contaminated sampling locations were on the western side of the car wash property near the boundary with the former Wheaton property. As shown in the table above, many of these results are significantly above the concentrations ever detected in groundwater during monitoring on the up gradient Company Property. The 2005 NJDEP Report concluded that the absence of all contamination in certain samples "suggest that no contaminants from [the Property] were detected during the September 2003 sampling event." The 2005 NJDEP Report further concluded that the "historic low levels of PCE [at the Property] and the concentration gradient across the NVCW site does not suggest that contaminants at the western side of the NVCW were attributable to ... [the Property]." (p. 23).

NJDEP did not conclude that the car wash operations were the source of the PCE in groundwater, as, according to the 2005 NJDEP Report, they could have migrated from the adjacent former Wheaton property. For the purposes of this report, however, the presence of PCE concentrations in groundwater at the car wash, as well as at the former Wheaton site, is considered a "source" of contamination, regardless of what operations or discharges actually caused this condition. As discussed below, both operations potentially contributed to the existing conditions. The importance of the findings of the 2005 NJDEP Report regarding groundwater gradients and the presence of PCE concentrations in groundwater at the NVCW and former Wheaton sites to this Final Groundwater Report is in relationship to groundwater data from Property wells MW-7 and MW-5 and support of the conclusion that PCE in groundwater in this area is unrelated to the Property and Facility operations.

NJDEP performed a similar groundwater sampling event on the former Wheaton property in April 2004. A total of sixty six (66) groundwater samples were collected during this sampling event and analyzed for VOCs. A summary of the PCE concentrations detected during this sampling event is provided in the table below. PCE was detected in 27 out of the 66 groundwater samples. The sampling locations are shown in Attachment E.

PCE DETECTED IN GROUNDWATER - WHEATON PROPERTY NJDEP STUDY APRIL 2004			
SAMPLE IDENTIFICATION *	PCE RESULT ug/l	SAMPLE IDENTIFICATION *	PCE RESULT ug/l
GW1C - 24	10	GW15D - 32	67
GW2B - 16	5 J	GW16C - 24	12
GW2C - 24	21	GW16D - 32	40
GW3B - 16	2 J	GW17B - 24	100
GW3C - 24	40	GW17C - 32	19
GW3D - 24	1 J	GW17D - 40	4 J
GW4C - 24	50	GW20C - 20	27
GW5C - 24	29	GW21B - 16	130
GW5D - 32	1 J	GW21C - 24	7 J
GW6B - 16	5 J	GW23C - 20	56
GW6C - 24	20	GW24C - 20	6 J
GW8C - 24	13	GW25D - 36	34
GW15B - 16	7 J	GW25E - 48	1 J
GW15C - 24	69		

* Last two digits in sample identification represent depth below grade in feet.

The samples with the highest PCE concentrations were located near the western side of the car wash septic system, the former Wheaton eastern septic system and the southern septic system at the front of the former Wheaton building. As shown in the table above, many of these results are significantly above the concentrations ever detected during groundwater monitoring on the Company Property.

NJDEP collected soil cores from 13 locations primarily in the area of the former eastern septic system at the Wheaton property in April 2004. This is the septic system that had significant concentrations of VOCs, including PCE, in sediments and reportedly had been removed in 1990. Based on field observations, 7 of these cores were analyzed using a field gas chromatograph (GC). A total of 5 samples were submitted to a CLP laboratory for analysis based on the field observations and field GC analyses. PCE was detected (2 ug/kg) in sample S6 at a depth of 15 feet below grade. A map showing the sampling locations is included in Attachment E.

Surface water and sediment samples also were collected by NJDEP in April 2004 and analyzed for VOCs. There were no analytes detected in the surface water samples and TCE and cis-1,2-dichloroethene (C-DCE) were the only analytes detected in the sediment

samples. TCE was detected at 36 ug/kg and 53 ug/kg in samples SED2 and SED3, respectively. C-DCE was only detected in SED4 at a concentration of 4 ug/kg.

Potentiometric data from the piezometers installed by NJDEP on the north side of the car wash indicated a very flat potentiometric surface. A figure is included in **Attachment E** which shows the locations of the piezometers and the elevation of the potentiometric surface. This figure indicates the possibility of groundwater a gradient from the car wash septic system toward Property wells MW-5 and MW-7.

The 2005 NJDEP Report concludes that the "essentially flat nature of the local ground water table and the potential for ground water mounding at the NVCW septic system present a possibility for PCE contaminants at the NVCW septic system to migrate radially for some distance." The 2005 NJDEP Report further concludes that "the former ground water mounding scenario described for Wheaton's eastern septic system also produces the possibility that residuals from former Wheaton operations may have migrated radially onto the NVCW site." (p. 31).

Based on the NJDEP review of the historic data and the data that it collected during its 2003/2004 investigation, there were a number of important facts identified and important conclusions reached by NJDEP, including:

- The Wheaton facility was a significant source of groundwater contamination (p. 2).
- The former Wheaton theory that VOC contamination from the groundwater concentrated in their septic systems, adsorbing to septic sludge, and was not from site discharges was not valid (p.6).
- A post-excavation sample from the Wheaton eastern septic system contained 13 ug/kg of PCE, which is attributable to discharges from the septic system (p. 11).
- Based on review of the soil vapor survey data at Wheaton, "The singular peaks are indicative of discreet discharges to soil, not contaminated ground water which tends to exhibit attenuated soil gas peaks." "Also indicative of discharge at this location is the large array and high concentration of soil gas contaminants that included trichloroethene and Tetrachloroethene"(p. 14).
- During an attempt to collect soil samples in the eastern septic system in 2004, "an extensive area of three quarter inch river stone" was encountered. "These layers and areas of gravel/stone were associated with the former wastewater disposal systems on the eastern side of the site and may still serve as conduits for rainwater and contaminant migration at the site" (p.13).
- The Wheaton "wastewater disposal systems would tend to cause local mounding of ground water, which is supported by interviews of facility personnel. This mounding would cause some portion of the normally upgradient areas at the

North Vineland Car Wash (NVCW) to become downgradient areas to which ground water (and potentially contaminants) would flow" (p.21).

- "The static water levels measured by the NJDEP in September 2003 indicate an essentially flat water table at the NVCW septic system, which presents a possibility that any contaminant discharged to the septic system could travel north [which is the direction of MW-7] prior to resuming flow to the southwest, which is the flow direction measured for this part of Vineland" (p. 21).
- In reference to PCE detected in groundwater samples on the western side of the NVCW property, a high concentration of PCE "was detected at position GW23, which ... does not seem attributable to either Andrews Glass or Shieldalloy" (p. 24).
- "Ground water flow maps produced by Wheaton during 1989 indicate groundwater flowed toward the east and southeast across the Wheaton site. These flow directions were supported by information that the eastern septic system caused complete saturation of the ground at the boundary between Wheaton and the NVCW" (p.24).
- "During 1988, samples from Wheaton monitoring well 1 (MW1) revealed PCE as high as 160 ppb. During 2003, the NJDEP detected PCE in groundwater at a location within feet of the MW1 position, indicating that the PCE at that location may be a continuing problem" (p. 30).

3.3.4 Current Site Data

As previously stated, groundwater samples were collected from monitoring wells on the Property on December 15, 2005. Monitoring wells MW-5 and MW-7 are located at the down gradient edge of the Property, adjacent to the NVCW. A summary of the PCE concentrations detected in these wells is shown in the table below.

WELL IDENTIFICATION	DECEMBER 2005 PCE CONC. (ug/l)
MW-5	2.23
MW-7	46.1
MW-7 (DUP)	50.6

The PCE concentration in well MW-5 was comparable with the concentrations observed during the period of the routine groundwater monitoring program. Additionally, comparative PCE concentrations in MW-5 and MW-7 during this recent sampling event were consistent with comparisons between these two monitoring wells in prior events and with the contaminant distribution seen in groundwater samples collected from the earlier temporary well point sampling event. PCE concentrations detected in the recent sample

and field duplicate from well MW-7 were very consistent indicating that the quality of the data was good. PCE was not detected in the trip blank. Current results from well MW-7 and the associated duplicate, 46.1 ug/l and 50.6 ug/l, were approximately half the concentration detected in 1995 (92 ug/l).

However, as the Property wells upgradient of this location have not exhibited detectable concentration of PCE for more than 10 years, well MW-7 would be expected to be clean if the source of the PCE at this location had been on the Property. Based on the above, the continuing PCE concentrations at MW-7 and the local hydrogeologic conditions in this area it is reasonable to conclude that the source of the PCE was the adjacent Car Wash and/or Wheaton properties.

3.3.5 Local Hydrogeologic Conditions

Local factors affect the hydrogeologic conditions in the vicinity of Property monitoring wells MW-5 and MW-7, adjacent to the property boundary with the North Vineland Car Wash. On at least two occasions (February and April 1995) the potentiometric data has indicated a reversal where the head is almost one foot higher in well MW-7 than MW-5. These anomalous events were noted and discussed in earlier Company reports submitted to NJDEP. NJDEP previously questioned if the data revealing this anomaly was valid, suggesting that it may have been due to field error. However, based on the NJDEP potentiometric study conducted as part of the agency's 2003 and 2004 investigation of the car wash and former Wheaton properties, this Property data captured such a period of this localized and short-term reversal.

The localized elevated PCE concentrations observed in Property well MW-7 are anomalous in consideration of the lack of PCE observed in the normal upgradient areas on the Property during the significant period of time monitoring at the Property has occurred. The extremely localized nature of the PCE in well MW-7, and the fact that it is not found in comparable concentrations in the next up gradient well, MW-5, is indicative of a local and off-site source.

Site data does not indicate that this occurrence is due to the presence of natural hydrogeologic features. It is likely that these hydrogeologic conditions and the PCE occurrence are attributable to manmade features.

It has been documented that features on the car wash and Wheaton properties are of the type that can cause the local hydrogeologic oddities seen here. The septic system associated with the car wash extends out the back of the car wash towards Property well MW-7. The only available drawing of the septic system indicated drainage laterals extending out close to the property line. A drain structure that apparently collects runoff from the former Wheaton building is located at the northeast corner of the former Wheaton property, very close to the property line near Property well MW-7. Added water discharge to the area near Property well MW-7 both from the car wash and the former Wheaton property could result in localized groundwater mounding and a reversal

of the flow pattern over a small area. The embankment on the Property adjacent to Property well MW-7 also could result in more surface water runoff to the level area near the property line. This would increase recharge in the level area and enhance groundwater mounding from the other water sources. While there is no indication the former UPS site contributes contamination, the presence of filled areas and/or sumps in the general area near the car wash border and MW-7 also may influence groundwater flow directions due to the basically flat gradient at certain times.

Both the car wash and the former Wheaton property have the potential to contribute PCE to the well MW-7 area. This area is adjacent to the former lagoons and eastern septic system on the Wheaton property where PCE contamination was documented. In addition, the highest PCE level detected in the soil vapor samples at Wheaton was close to the property boundary. The car wash also represents a significant potential contributor of PCE due to the use of engine cleaners, electrical components cleaners, metal cleaners and brake cleaners that are available over-the-counter in retail establishments for use by the general public. During a reconnaissance of the area, as documented in previous reports, a can of engine cleaner was found on the roadside at the entrance to the car wash (Attachment F). Any of these products used at the car wash would discharge directly to the septic system and would be directed toward the area of Property well MW-7 by the drain field.

The 2005 NJDEP Report concluded that, "The essentially flat nature of the local ground water table and the potential for ground water mounding at the NVCW septic system presents a possibility for PCE contaminants at the NVCW septic system to migrate radially for some distance. Such a scenario creates a possibility that Wheaton MW1 and April 2004 Wheaton sample locations GW6, GW8, GW9 could have been impacted by PCE from the NVCW septic system. However, the former ground water mounding scenario described for Wheaton's eastern septic system also produces a possibility that residuals from former Wheaton operations may have migrated radially onto the NVCW site."

The 2005 NJDEP Report further concludes that the "historic low levels of PCE [in groundwater at the Property] and the concentrations gradient across the NVCW site does not suggest that contaminants at the western side of NVCW were attributable to ...[the Property]." (p. 23). It also concludes that "no contaminants from [the Property] were detected during the 2003 sampling event." (p. 23) Given these conclusions, PCE concentrations in Property well MW-7 can not be attributable to the Property or Facility operations.

Additionally, the 2005 NJDEP Report identifies a mechanism that would move contaminated groundwater in the area between the NVCW and former Wheaton sites toward Property well MW-7. While it appears that during the September 2003 monitoring event by NJDEP, the extent of radial flow from the NVCW septic system did not exceed 75 feet, MW-7 is well within this zone. Considering the flat gradient in the area of Property wells MW-5 and MW-7 and the northern side of the car wash and Wheaton properties, the impacts of water discharges from the nearby car wash and Wheaton septic

systems would very easily result in a mounded condition creating a radial flow causing localized reversal of the groundwater flow such that contaminants from either or both of these sites could impact the area of Property well MW-7. This is supported by the data collected by NJDEP from the piezometers they installed in this area. Thus, it is reasonable to conclude that Property wells MW-5 and MW-7 reflect impacts from down gradient offsite sources at Wheaton and/or the North Vineland Car Wash.

3.3.6 Downgradient Conclusions

Groundwater samples collected in December 2005 from Property monitoring wells were as expected based on historical sampling events. The 2005 data indicated that there was a very low PCE concentration in well MW-5 (2.23 ug/l) and that the concentration increased at down gradient well MW-7 (50.6 ug/l). These concentrations were significantly less than PCE concentrations detected during NJDEP sampling of groundwater at the NVCW and former Wheaton sites in 2003 and certain samples from the 2004 event.

The data collected by NJDEP in 2003 and 2004 also provides documentation of a localized hydrogeologic anomaly in the area where the Property, Wheaton, and North Vineland Car Wash properties meet. Potentiometric data collected by NJDEP indicated that the hydraulic gradient in this area is extremely low and that the groundwater flow pattern likely varies in response to mounding caused by discharges to the septic systems at the car wash and flow through certain subsurface conditions at the former Wheaton site. Mounding in this area can result in a radial flow pattern that would direct groundwater and potential contaminants from the car wash and Wheaton sites towards the Property. This groundwater flow, the elevated PCE concentrations that have occurred at the Wheaton site, the contaminated groundwater present in the area between the car wash and former Wheaton site, coupled with the historic lack of PCE concentrations at the Property that could represent a source for PCE at this location, substantiate that the PCE observed in Property wells MW-5 and MW-7 originated offsite.

4.0 SUMMARY

Provided in the sections above are compilations of the available data for PCE in the groundwater upgradient of the Property, on the Property and down gradient of the Property. There are multiple potential sources of PCE upgradient from the Property. These are indicated by the presence of PCE at multiple locations, including a well on Catawba Avenue northeast of the Property, in recovery well W9 at the SMC facility east of the Property, and in monitoring wells on the Research Glass site north of the Property. Potentiometric data indicate that these locations are all clearly upgradient of the Property. Additionally, potentiometric data confirms that the capture zone for well W9 at SMC does not extend onto the Property. PCE concentrations in the monitoring wells from Research Glass routinely exhibited higher concentrations of PCE than those detected in the Property monitoring wells.

Current groundwater data collected in December 2005 from Property wells indicate that there was a trace level of PCE in MW-2 at the northern side of the property. PCE was not detected at MW-3 and MW-6 in the central portion of the property.

PCE was detected at a concentration of 50 ug/l in MW-7, which is on the downgradient property line. This concentration was approximately half the concentration detected in the last monitoring event at this well in 1995. Investigations conducted in 2003 and 2004 by NJDEP documented a mechanism that causes a hydrogeologic anomaly in the area of MW-7. Potentiometric data from piezometers installed by NJDEP indicated that the hydraulic gradient is almost flat and that discharges to the septic systems at the car wash and/or at the former Wheaton site result in groundwater mounding, which creates a radial flow outward from this area and a localized, periodic reversal of groundwater flow directions. Two prior groundwater sampling events at the Property indicated such a condition, finding that the water level in MW-7, normally lower than that at MW-5, a slightly up gradient well, actually was higher than the level at MW-5. The anomaly noted during this prior groundwater sampling event had been discussed previously with NJDEP, without the benefit, however, of the confirmation of the mechanism causing it that is provided by the potentiometric study conducted by NJDEP and published in the 2005 NJDEP Report.

This groundwater mounding and radial flow has the potential to transport contaminants from the car wash and former Wheaton site northward onto the Property. The Wheaton site has been documented to be a source of significant VOC contamination, including PCE, and historic groundwater data have shown that PCE concentrations on the Wheaton site were consistently higher than those detected in Property wells. The car wash also has a potential to be a source of PCE. The above factors, as well as the lack of any Property condition contributing to PCE concentrations at MW-7, requires the conclusion that groundwater quality at the Property down gradient boundary line is reflective of off-site conditions, not representative of those at the Property itself.

5.0 CONCLUSIONS

Groundwater data from December 2005 indicate that PCE was either not detected or present at trace levels (0.5 above NJDEP groundwater quality standards) on the Property, except for well MW-7 at the southern property line.

Historic groundwater data indicate that there were sources of PCE upgradient from the Property. PCE concentrations in groundwater at up gradient Research Glass were routinely higher than those observed in Property wells and continued for years after elimination of any potential sources at the Property.

Historic groundwater data and recent data collected by NJDEP indicate that there are several known and potential sources of PCE adjacent to the Property's southern boundary

and that contaminated groundwater is present at these two sites.

Potentiometric data collected in 2003/2004 by NJDEP confirm that the groundwater flow pattern in the area of Property well MW-7 and the northern portions of the car wash and Wheaton sites is variable due to a very flat potentiometric surface and the effects of discharges to septic systems at the car wash and Wheaton sites. This results in localized, periodic but short-term, groundwater mounding and a radial groundwater flow pattern.

Based on the groundwater flow pattern and the presence of confirmed offsite sources of PCE (the presence of contaminated groundwater) adjacent to the downgradient Property line, the data indicates that the PCE detected in Property well MW-7 originated offsite and reflects off-site conditions, rather than being representative of conditions at the Property.

As there is no source of PCE on the Property due to prior remedial actions, and the only detectable PCE concentrations on the Property occurred near the northern and southern boundaries where offsite sources have been documented to exist, the Property does not represent a risk to human health or the environment.

Thus, no further actions by the Company are warranted either on or off the Property. The Company requests that NJDEP consider the Company's ISRA compliance fully complete and issue a No Further Action Letter and Covenant Not to Sue.

6.0 REFERENCES

ERT, 1988. Historical VOC Usage at the SMC, Newfield, New Jersey Facility, August 31, 1988.

TRC, 1992. Remedial Investigation Technical Report, Shieldalloy Metallurgical Corporation, Newfield, New Jersey, April 1992.

TRC, 1993. Final focused Feasibility Study Report, Shieldalloy Metallurgical Corporation, Newfield, New Jersey, April 1993.

BCM Engineers, 1992. Soil and Sludge Analytical Results, Andrews Glass Company, March 16, 1992.

Remcor, 1993. Upgradient Source Demonstration - Wheaton-Galena Facility, Vineland, New Jersey. February 1993.

McClaren-Hart, 1993: Remedial Investigation Report, Andrews Glass company, Vineland, New Jersey. May 1993

McClaren-Hart, 1994: Site Characterization and Remedial Investigation Report, Andrews Glass company, Vineland, New Jersey. July 1, 1994:

ST Environmental, 1999: Site Evaluation Report, Andrews Glass company, Vineland,
New Jersey. July 1999

ST Environmental 2000: Site Summary Report, Andrews Glass company, Vineland,
New Jersey. December 2000

FIGURES

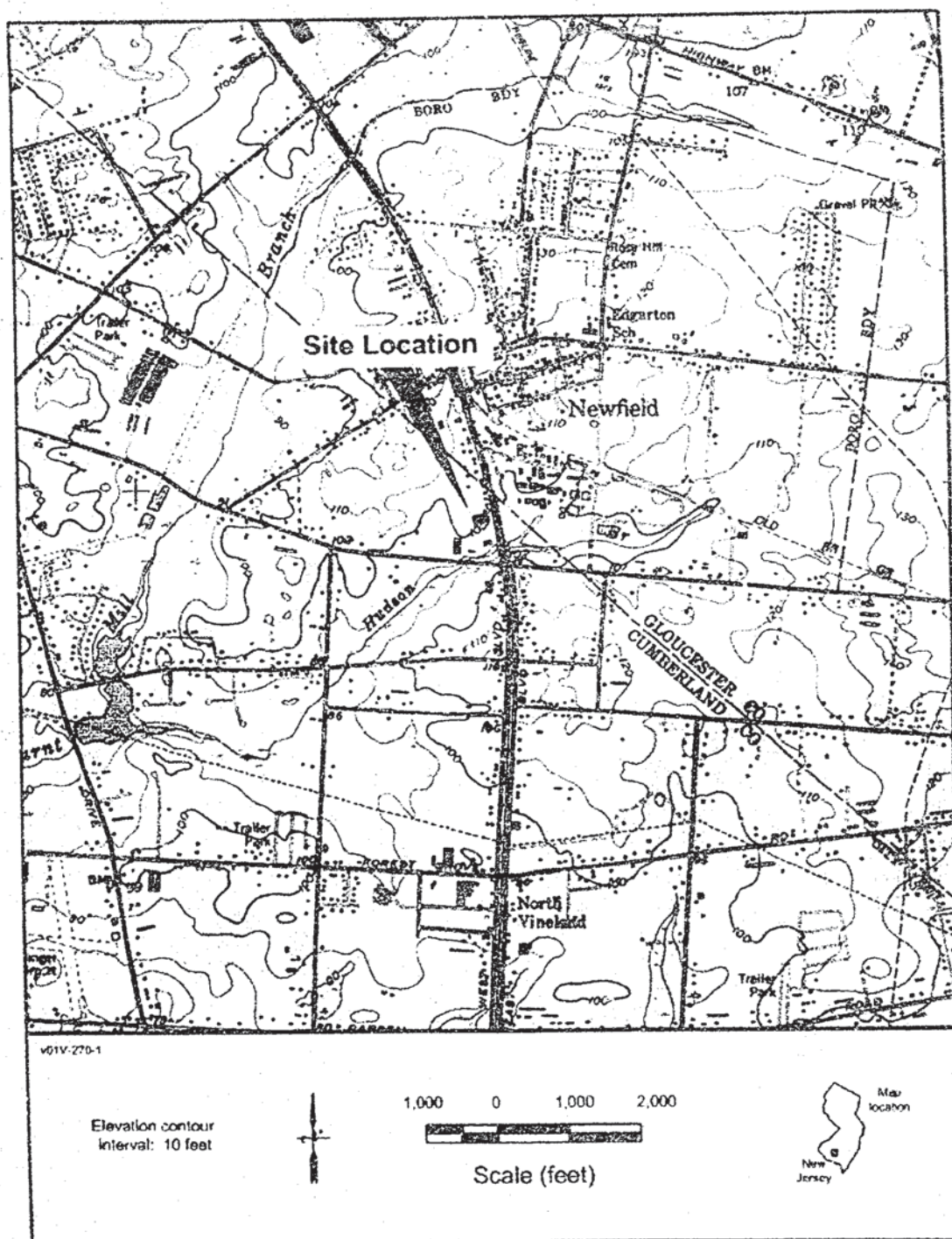
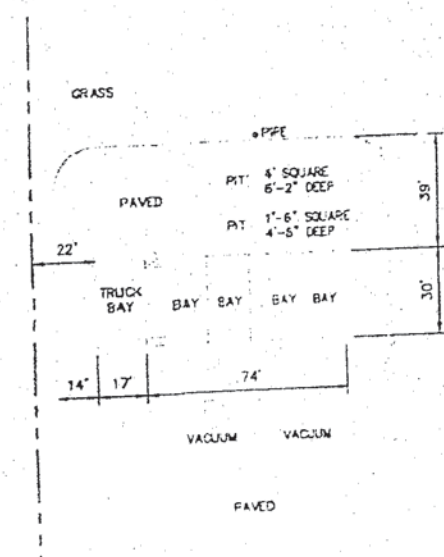
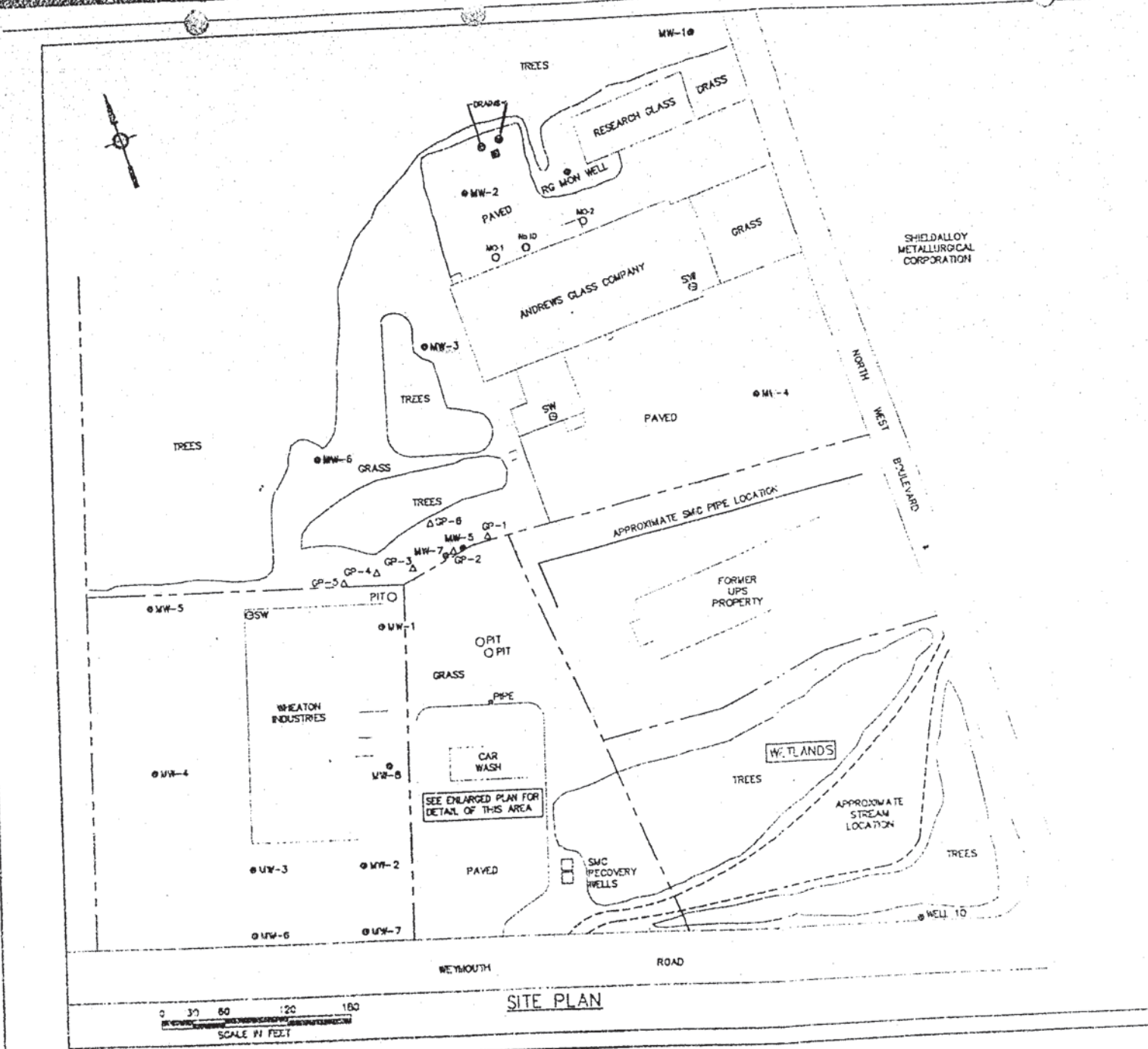


Figure 1 Site Location Map



CAR WASH ENLARGED PLAN

- LEGEND
- PROPERTY LINE
 - M.W. MONITORING WELL
 - R.W. RECOVERY WELL
 - △ FORMER SMC RECOVERY WELL

FIGURE 2
SITE PLAN
Andrews Glass Company Property
Vineland, New Jersey
Sigma Environmental Services, Inc.

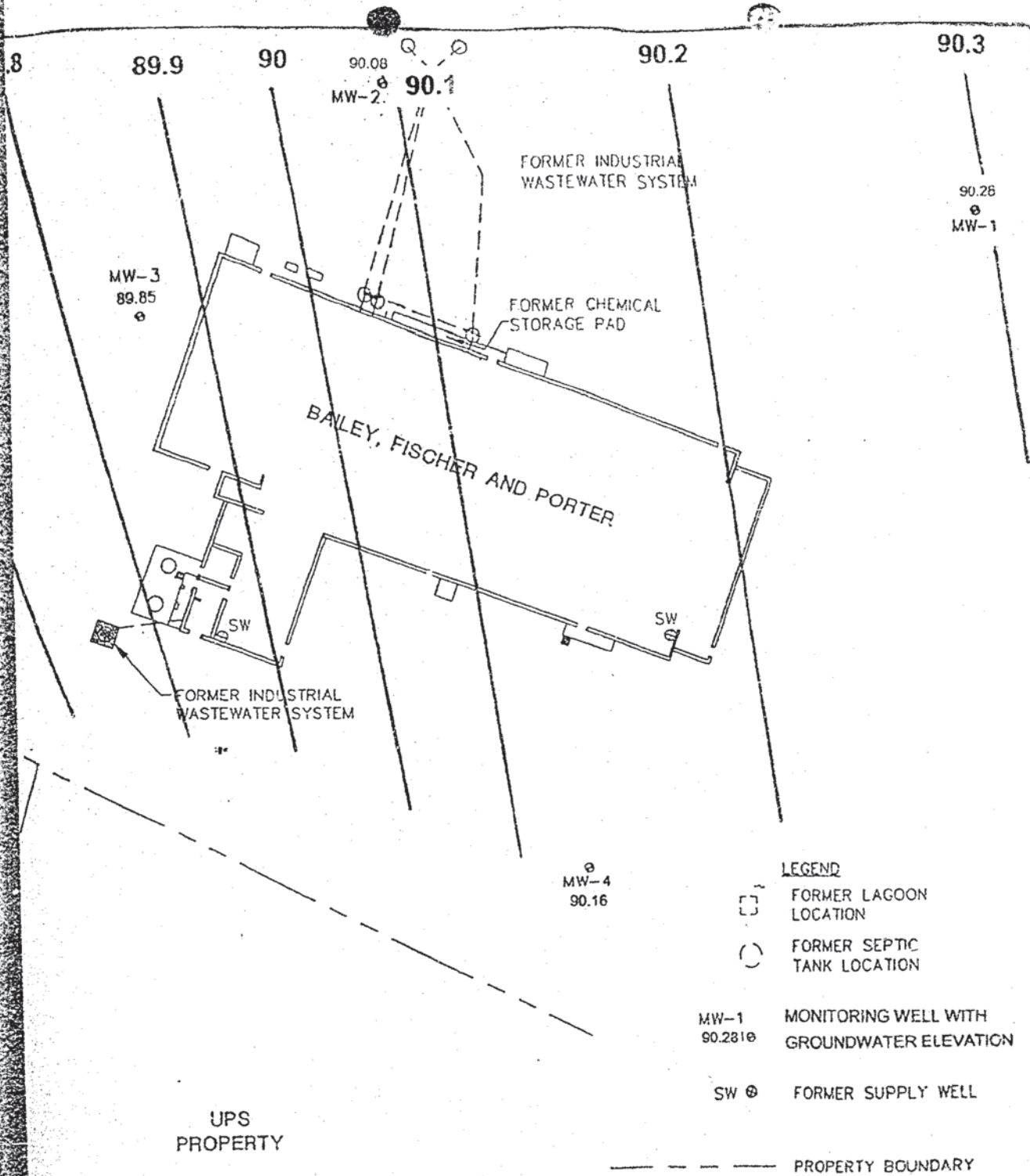
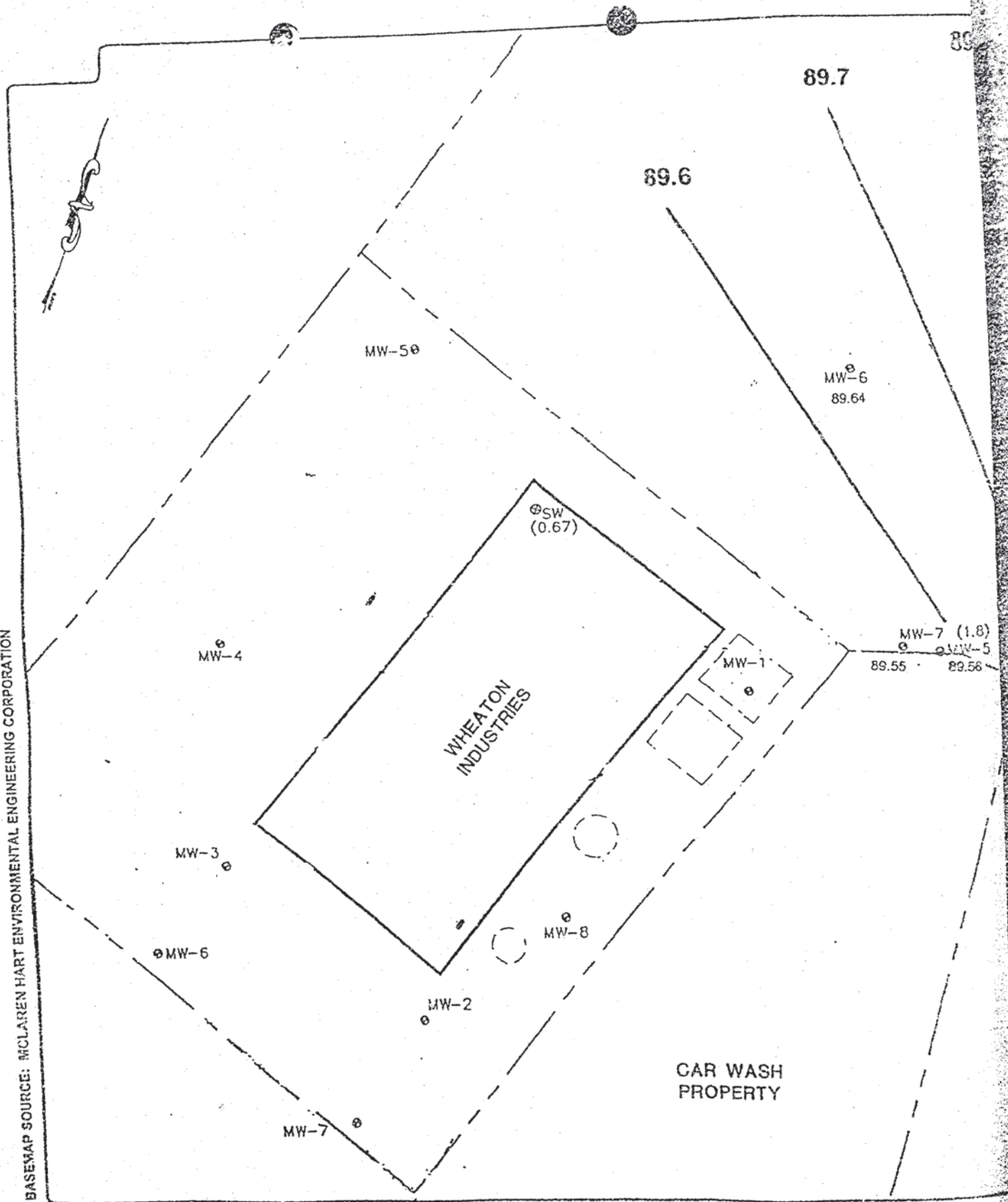
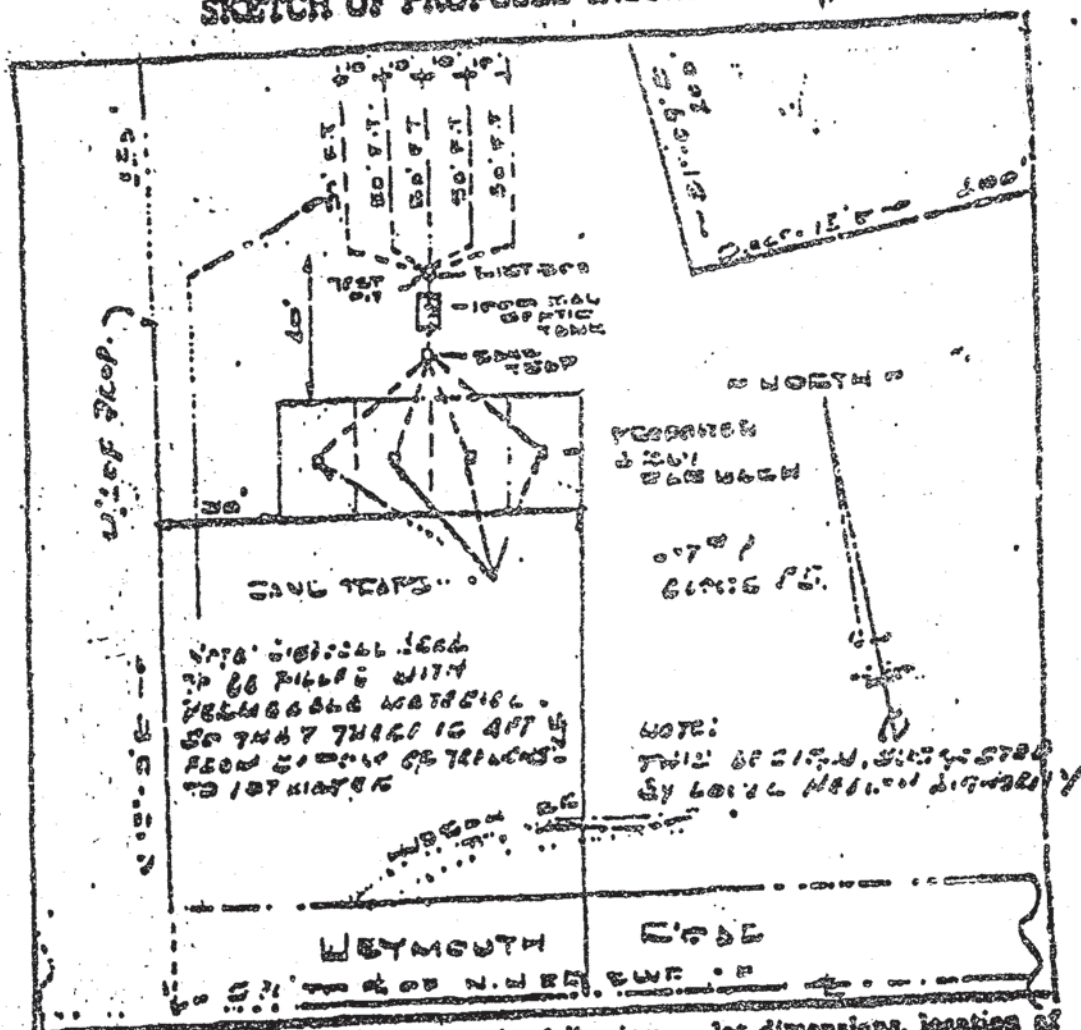


FIGURE 3
POTENTIOMETRIC CONTOUR MAP
 July 11, 1995
 Andrews Glass Company Property
 Vineland, New Jersey
 Sigma Environmental Services, Inc.

BASEMAP SOURCE: MCLAREN HART ENVIRONMENTAL ENGINEERING CORPORATION



SKETCH OF PROPOSED INSTALLATION



Make an accurate sketch showing the following -- lot dimensions, location of house, location of each unit of disposal system, all buildings and large trees in disposal area. Include distances from house, side and rear lot lines, existing buildings, large trees and sewerage units.

The undersigned agrees to construct the aforesaid individual sewerage disposal system in accordance with the provisions of an ordinance entitled: "AN ORDINANCE establishing a code to regulate and control the location, construction, use, maintenance, and method of emptying or cleaning individual sewerage disposal systems, or other pieces used for the reception or storage of human excrement, the issuance of (licenses) (permits) and providing penalties for the violation thereof," adopted by the Board of Health of (date).

Owner:
Contractor:

A. J. EDWARDS, C. E.
Professional Engineer and Land Surveyor
San Antonio, Texas
17. Edwards, San Antonio

FIGURE 4

CAR WASH DRAIN FIELD

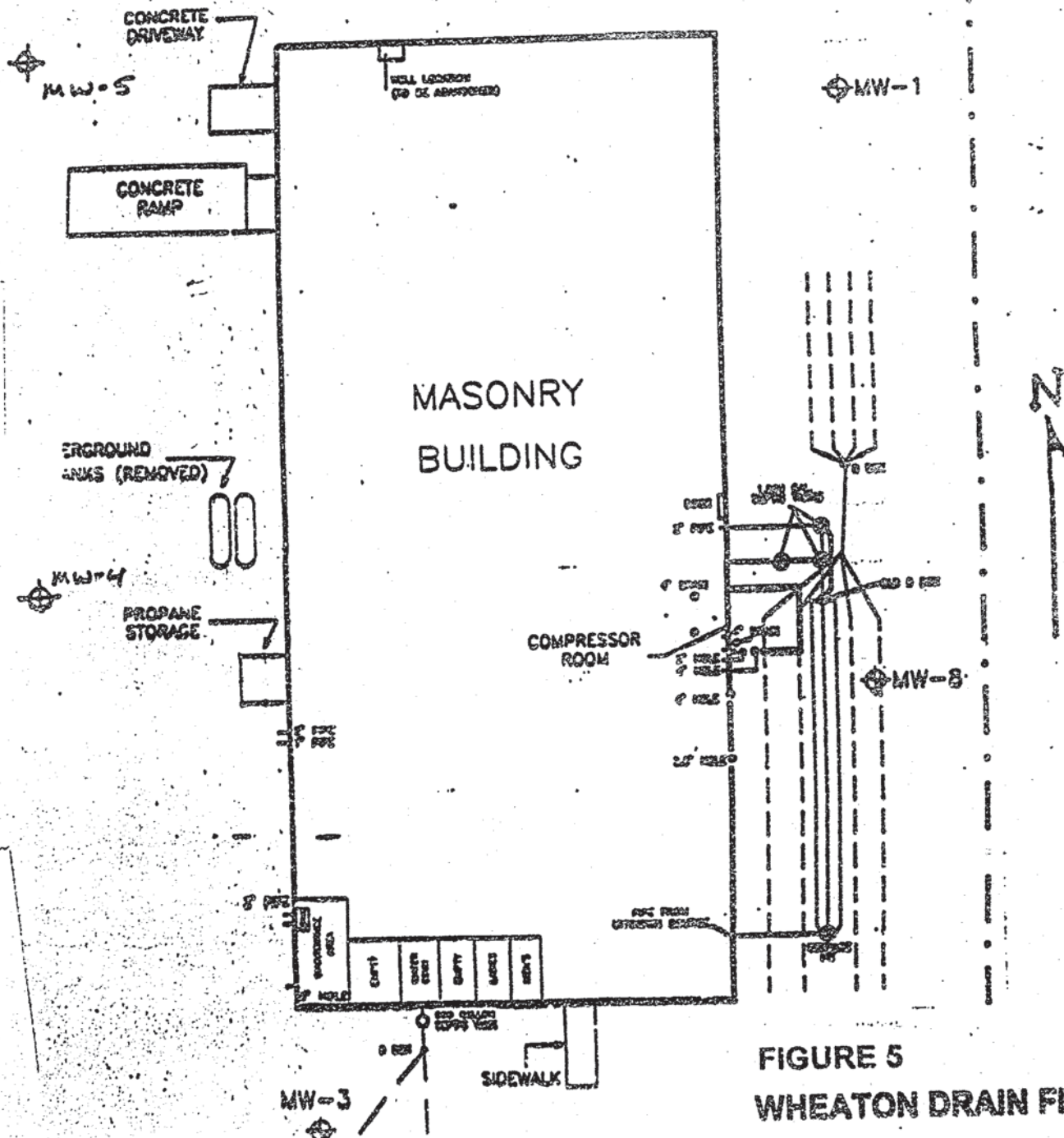


FIGURE 6
PCE CONCENTRATIONS IN GROUNDWATER
RESEARCH GLASS (RED), vs THE SITE (BLUE)

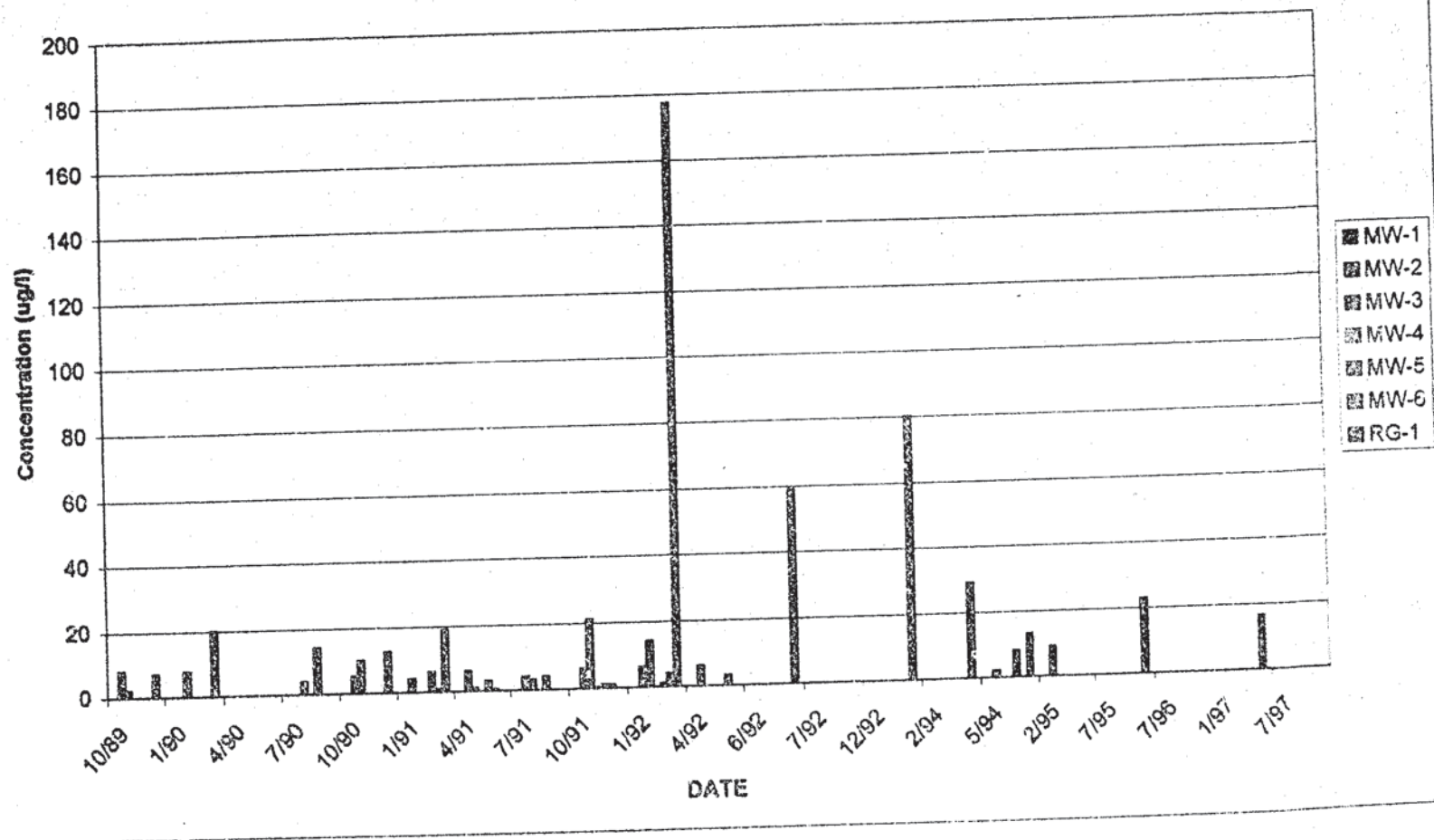


FIGURE 7
BTEX CONCENTRATIONS IN GROUNDWATER
RESEARCH GLASS WELL-1

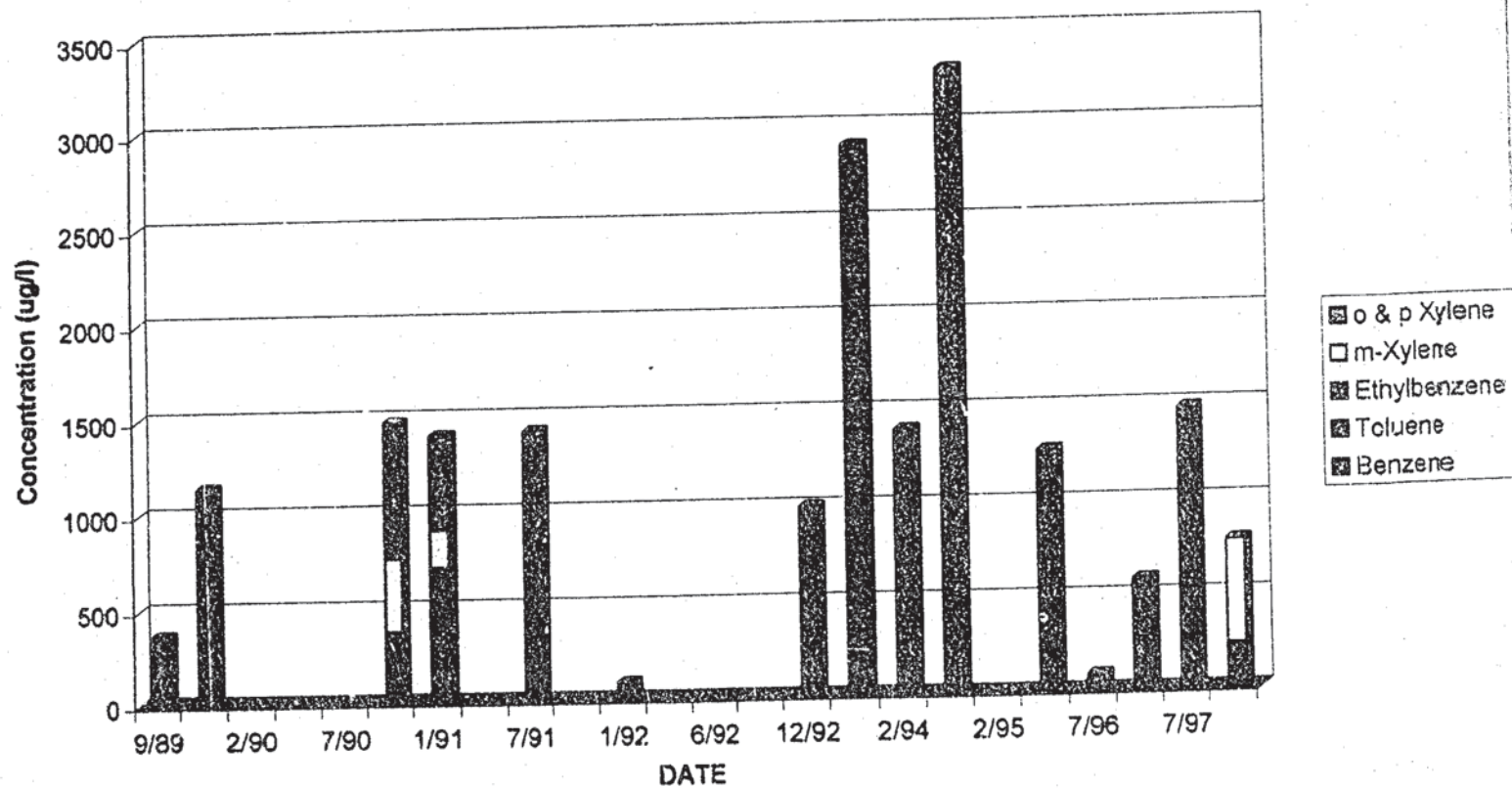
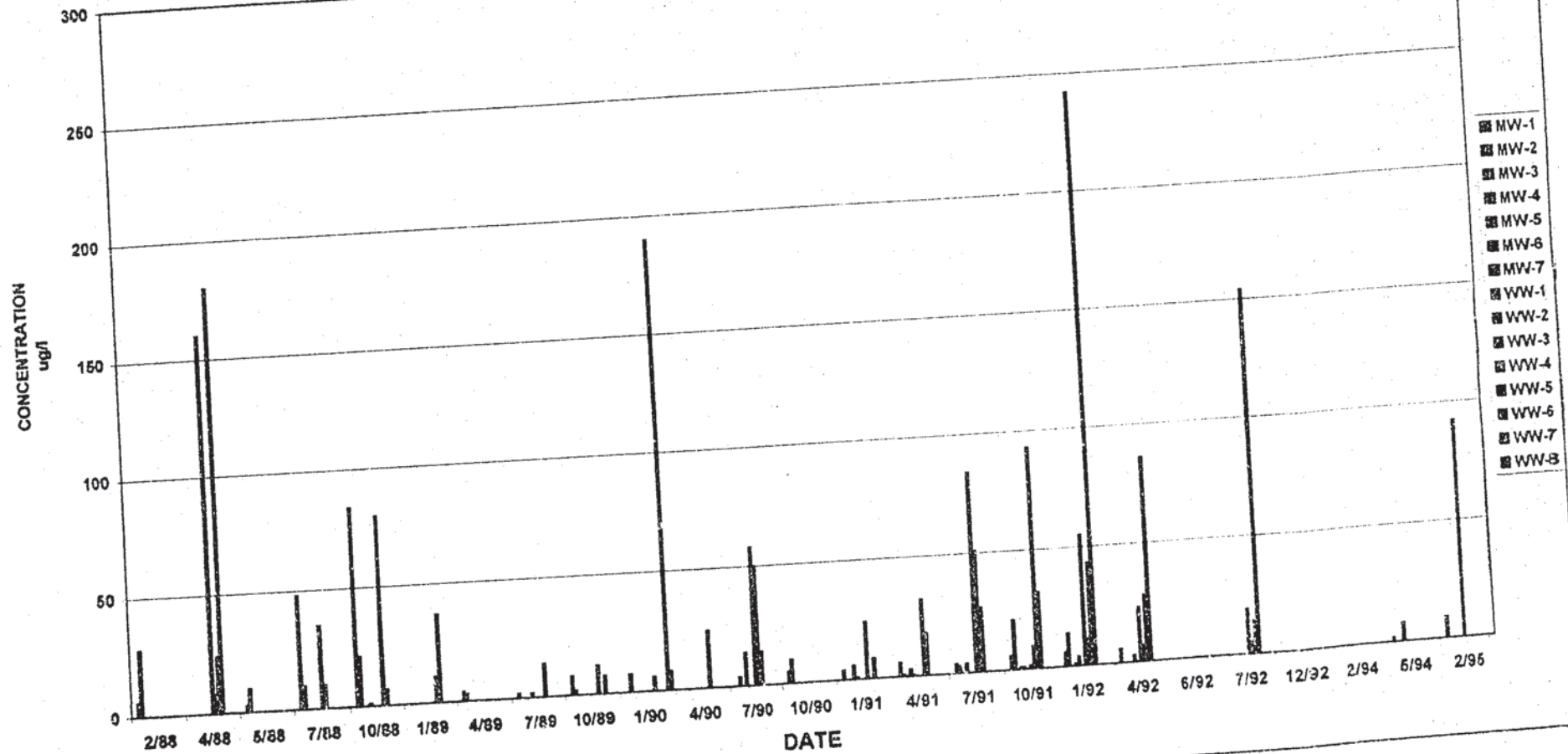


FIGURE 8
PCE CONCENTRATIONS IN GROUNDWATER
WHEATON (Red) vs SITE (Blue)



ATTACHMENT A
SUMMARY OF HISTORIC REPORTS SUBMITTED TO NJDEP

ATTACHMENT A - SUMMARY OF HISTORIC REPORTS SUBMITTED TO NJDEP

September 9, 1988: Installation and Initial Sampling of the Groundwater Monitoring System Required by NJPDES Permit NJ0063797, Fred C. Hart Associates, Inc.

September 1989: Sampling Plan, BCM Engineers, Inc.

June 1990: Revised Sampling Plan Proposal, BCM Engineers, Inc.

February 1991: Northern Industrial WasteWater System Soil Vapor Survey, BCM Engineers, Inc.

March 12, 1992: NJPDES Monitoring Summary, McLaren Hart Environmental Engineering, Corp.

March 16, 1992: Soil and Sludge Analytical Results, BCM Engineers, Inc.

May 14, 1993: Remedial Investigation Report, McLaren Hart Environmental Engineering, Corp.

April 21, 1994: General Information Notice under ISRA.

May 20, 1994: Preliminary Assessment Report, McLaren Hart.

May 20, 1994: Final ISRA Site Investigation/Remedial Investigation Workplan, McLaren Hart.

July 1, 1994: Site Characterization and Remedial Investigation Report, McLaren Hart.

April 14, 1995: Supplemental ISRA Investigation Report, McLaren Hart.

May 8, 1996: Interim Groundwater Delineation Investigation, McLaren Hart.

August 1997: Groundwater Delineation Investigation Report, McLaren Hart.

July 1999: Site Evaluation Report, ST Environmental Professionals, Inc.

December 2000: Site Summary Report, ST Environmental Professionals, Inc.

ATTACHMENT 14

***NJDEP Environmental Concerns Tracking Sheet, Fischer & Porter Co., Electronics Division,
ISRA Case No. E94164, September 9, 2008***

ENVIRONMENTAL CONCERNS TRACKING SHEET

INDUSTRIAL ESTABLISHMENT

Name: FISCHER & PORTER CO. - ELECTRONICS DIVISION

ISRA Case Number: 94164

POTENTIAL SOURCES OF CONTAMINATION

Drum Storage <input checked="" type="checkbox"/>	Waste Pile <input type="checkbox"/>	Seepage Pit <input type="checkbox"/>	Transformer <input checked="" type="checkbox"/>	Other <input type="checkbox"/>
Discharge <input type="checkbox"/>	Monitor Well <input checked="" type="checkbox"/>	Dumpster <input checked="" type="checkbox"/>	Tank Farm <input type="checkbox"/>	Other <input type="checkbox"/>
Potable Well <input type="checkbox"/>	Floor Drain <input checked="" type="checkbox"/>	Bldg. Decon. <input type="checkbox"/>	Catch Basin <input type="checkbox"/>	Other <input type="checkbox"/>
Roof Drain <input type="checkbox"/>	Septic System <input checked="" type="checkbox"/>	Asbestos <input type="checkbox"/>	Landfill <input type="checkbox"/>	
UST <input checked="" type="checkbox"/>	Lagoon <input type="checkbox"/>	Spill <input type="checkbox"/>	AST <input checked="" type="checkbox"/>	

POTENTIAL AREAS OF ENVIRONMENTAL CONCERN

Area of Concern A: DOMESTIC WASTE WATER TREATMENT SYSTEM (septic system) TWO one on west, one on east
 For the septic system on the eastern side of the facility, samples ST-1 through ST-4 were collected. One sample was collected adjacent to each of the 4 septic tanks. For the septic system on the west side of the facility, samples ST-5 and ST-6 were collected. One sample was collected adjacent to each of the 2 tanks. The samples were collected 5/94 from the 2' interval above GW/soil interface and analyzed for VO, BN, PPM, PHC and PH. All parameters were below the RDCCC and the IGWCC.

Final Outcome: All sampling results were below the 2/94 RDCCC and the IGWCC. No further action is acceptable.

"NFA" Appv'd: CM Initials LLG

Date 9/14/94

Area of Concern B: FORMER USTs (1,000g and 8,000g) #2 FUEL OIL
 UST were removed in '89. Post-ex ssamples up to 9,000 ppm. Propose to collect two soil borings through excavation to verify soil quality. In 5/94, 2 samples were collected to verify the '89 results. PHC levels were below 220 ppm.

Final Outcome: Since the sampling results are below the cleanup criteria of 10,000 ppm for PHC, no further action is acceptable.

"NFA" Appv'd: CM Initials LLG

Date 9/14/94

Area of Concern C: FORMER CHEMICAL STORAGE PAD (north of bldg)

Results of Sampling: Pad is not bermed and area was not always paved. In May 1994, three samples were collected from the accessible sides of the pad and analyzed for PH, PHC and VO. All parameters are below the RDCCC and the IGWCC.

Final Outcome: No further action is acceptable. All results are below the 2/94 RDCCC and IGWCC.

"NFA" Appv'd: CM Initials LLG

Date 9/14/94

(2)

ENVIRONMENTAL CONCERNS TRACKING SHEET

POTENTIAL AREAS OF ENVIRONMENTAL CONCERN

Area of Concern D: PETROLEUM STAINED SOIL

This was 2x2' area NW of bldg. In 5/94, the visually contaminated soils were excavated to a depth of 21". Two post-ex samples were collected and analyzed for PHC and VO. All post-ex samples were below the 2/94 RDOCC and the IGWCC. No further action is acceptable. Excavated soil was transported to Remtech Environmental in Lewisberry, PA. The appropriate soil disposal documentation was submitted June 9, 1995.

"NFA" Appv'd: CM Initials LLG Date 07/01/95 (LETTER 3/96)

Area of Concern E: GRINDING SAND DEPOSITS - STAINED SOIL

This was a 3x3' area NW side of bldg. In 5/94, visually contaminated soil was excavated to a depth of 12". 2 post-ex samples were collected for PPM and pH. pH = 5.8 - 6.5 and all PPM were below the 2/94 RDOCC and IGWCC.

Based on the post-ex results, no further action is acceptable. Excavated soil was transported to Remtech Environmental in Lewisberry, PA. The appropriate soil disposal documentation was submitted June 9, 1995.

"NFA" Appv'd: CM Initials LLG Date 07/01/95 (LETTER DATED 3/96)

Area of Concern F: TWO PRODUCTION WELLS

2 production wells are present onsite:

One is located in the front of the building. It was abandoned in the 1960s when municipal water became available.

The second well is located towards to rear of the building. In 5/94, the production well was sampled for VO+15. Results indicated the following above the GWQS: PCE = 7 ppb and TCE = 5 ppb. The well was closed in the 1990s. To confirm this, the tile floor was removed 10-29-08. The former well head was observed to be sealed with concrete and rendered inaccessible.

As indicated in the AOC below entitled "Ground Water Investigation", no further action is required with regard to the ground water on-site since F&P. The remaining VOs in the ground water have been attributed to offsite sources.

"NFA" Appv'd: CM Initials MJB Date 12-23-08

Area of Concern: POLE MOUNTED TRANSFORMERS

Transformers do not belong to Fischer and Porter and are not maintained by them. No evidence of discharge (6/24/94 SI).

"NFA" Appv'd: CM Initials LLG Date 6/29/94

Area of Concern: FORMER INDUSTRIAL WASTEWATER TREATMENT SYSTEM - SOUTHWEST OF BLDG

On 4-3-86, a sediment sample was collected from M4 and analyzed for VOs. The report says PCE was not detected.

The system was removed in March 1993, along with the system on the north side of the facility. Thirty post-excavation samples were collected on 3-23-93 and analyzed for VOs and TPH. All samples were clean. Due to PCE and TCE contamination in nearby MWS, samples were collected Feb. 1995 northwest of the former WW system (SB-1). The samples were collected from 4-4.5' (highest PID reading) and 8-8.5' (above the WT) and analyzed for VO+10. Results were below the RDOCC and IGWCC.

NFA is required since post-remedial and additional soil sampling are below the RDOCC and the IGWCC.

"NFA" Appv'd: CM Initials LLG Date 05/05/95

POTENTIAL AREAS OF ENVIRONMENTAL CONCERN

Area of Concern G: Ground Water Investigation

F&P was involved in the production of lab glassware and printed circuit boards. Lab glassware was etched by coating it with wax, scribing the wax, and then immersing the glass in hydrofluoric acid. The wax residue was removed on the glass by a vapor phase degreaser that used the solvent tetrachloroethylene (PCE). The glassware was then rinsed and all wastewater was discharged to the northern industrial wastewater treatment system.

In 1988, 6 wells were installed to monitor the Industrial waste water treatment system. MW-1 is upgradient of the site, MW-2 is near former WW treatment system at north side of facility, MW-3 is downgradient of Grinding Sand Deposit AOC, MW-5 is adjacent to the former WW treatment system at southwest corner of the facility, MW-6 is downgradient.

The wells were sampled quarterly. Historically, PCE and TCE and trace quantities of other chlorinated VOs were detected in MW2, MW3, and MW5. In the 3rd quarter '93, only 12 ppb of TCE in MW2. All others compounds are below the GWQS. In May 1994, all wells were sampled for PPM, VO, BN, COD, hex Cr, Fluoride, pH, sulfide and TDS. The following was detected above the GWQS: Aluminum in all wells upto 1.1 ppb, Fe at 12 ppb in MW1, Mn at .13 and .0068 ppb in wells 1 and 6, respectively, PCE in MW2 at 2 ppb and in MW5 PCE at 8 ppb and TCE at 8 ppb.

On 6-14-94, six geoprobe samples (GP-1 through GP-6) were also collected near the downgradient property line for VOs (7-9' or 11-13', and 23-25'). Results indicated that PCE was detected in 3 samples at 7 - 180 ppb and TCE at 10 - 26 ppb. MW-7 was installed at geoprobe sample 3 (100 ppb of PCE) in January 1995. Sampling results indicated 92 ppb of PCE (other parameters <GWQS).

F&P proposed to postpone delineation until they had an opportunity to review files pertaining to a regional GW. On 11/02/95, The NJDEP named F&P along with Shield Alloy as potential responsible parties for the regional GW contamination. Regional report was submitted June 1997. NJDEP disagrees with the conclusion that the contamination in the wells is from off-site sources.

F&P submitted a 7-29-99 report concluding that F&P has had no unacceptable impact on the gw quality in the area surrounding their site. The NJDEP faxed a letter on 10-16-99 disagreeing with this position. An NOV was issued December 5, 2000. In response, F&P submitted a Site Summary Report dated December 28, 2000 to further support its conclusion.

As indicated in the NJDEP's Feb. 1, 2002 letter, arguments presented by F&P in regard to historic PCE impact are predominantly unsupported and fail to show that F&P has not had an off-site, historic impact. During the next few years, the DAG's office was involved and there was many discussions and/or meetings between the DAG's office and the DEP case team, as well as between the DAG's office and the F&P representatives.

On December 15, 2005, F&P sampled monitoring wells MW-2, MW-3, MW-5, MW-6 and MW-7 for PCE. The levels of PCE in MW-2, MW-3 and MW-5 were at or below the GWQS. Monitoring wells MW-6 and MW-7, which are at the downgradient property boundary, had 2 ppb and 46 ppb of PCE, respectively.

CONCLUSIONS (as per geologist's 9-9-08 memo)

The Dec. 2005 round of ground water sampling did not detect PCE above the GWQS in the on-site wells MW-2, MW-3 and MW-6.

In regard to the downgradient detections of PCE in wells MW-5 and MW-7, the NJDEP investigations conducted at the former Wheaton facility and the North Vineland Car Wash identified the presence of PCE on both sites that appears unrelated to the Fischer & Porter site. Discharge features on both sites have been identified (i.e. subsurface storm water collection units at Wheaton and the septic system at the car wash) that could potentially cause localized ground water mounding, which in theory, could extend to wells MW-5 and MW-7. Considering this, impact in downgradient wells MW-5 and MW-7 is not considered to be related to the Fischer & Porter site.

Historically, the Fischer & Porter site had a documented source of PCE and a discharge mechanism (industrial waste water system) to introduce this impact to the subsurface. The discharge from the vapor degreaser to the industrial wastewater system began in 1961 and decreased in volume after 1970 due to increased use of decals to mark lab glassware. It is logical to conclude that the bulk of PCE discharge occurred between 1961 and 1972. All facility discharges except non-contact cooling water ceased in September 1986 after non-contact cooling water continued to be discharged to the system for almost two years. This condition effectively flushed the industrial waste water system and associated leach-field of contaminants before ground water sampling associated with the Fischer & Porter NJPDES-DGW permit was initiated in February 1988. In 1986, PCE was detected in downgradient residential wells and attributed to the Andrews Glass facility. Unfortunately, there is a lack of on-site source concentration data from the time of the heaviest discharge (1961 to 1972) to accurately assess contaminant fate and transport. In addition, almost 35 years have passed since the time of the heaviest discharge at the site. There are numerous hydraulic influences in the north Vineland area (i.e. intermittent pumping of known and unknown irrigation wells, pumping of municipal production wells, historic and current use of residential wells, gaining and losing streams and lakes) and it would be nearly impossible to predict the current location and concentration of the impact. It would also be very difficult to differentiate between historic contaminant sources (i.e. Fischer & Porter) and other more local or contemporary potential source contributions. As such, characterization of off-site impact attributable to the historic discharge at the Fischer & Porter site is considered technically impracticable and a poor use of available resources.

In light of the above information, no further action is required for the ground water.

Monitoring wells MW-1 through MW-7 were properly abandoned 10-29-08.

"NPA" Appv'd: CM Initials MJB Date 9-9-08

4

POTENTIAL AREAS OF ENVIRONMENTAL CONCERN

Area of Concern H: CONCRETE PAD

This was 3x4' pad on the south side of bldg. 1 sample from the pad, 2 samples for PHC, VO and pH. In 5/94, the pad was removed. The soil was visually clean. 2 samples were collected to determine if there was any impact. The samples were analyzed for VO, PHC, and pH. pH was 7.1 - 7.5 and all parameters were below the RDCCC and IGWCC.

No further action is acceptable since soil samples are below the 2/94 RDCCC and IGWCC.

"NFA" Appv'd: CM Initials LLG

Date 9/14/94

Area of Concern I: FORMER INDUSTRIAL WASTEWATER TREATMENT - NORTH SIDE OF BLDG

On the north side of the building there was a waste water treatment system. The system consisted of 2 seepage pits which were 3' diameter and 6' deep (M1 aka M-01, & M3 aka M-02), a solid concrete tank (M2), distribution box which was 3' by 3' by 4' (DB), and 2 field drains which were 9' in diameter and 15' deep (C1 & C2). In July 1991, a soil vapor survey was done. Soil vapor samples were collected from 27 locations. PCE was detected in 24 locations. The highest levels were near seepage pit M3. Based on these results, borings S1, S2 and S3 were installed and sampled from 4-5' and 10-11' for VOs. All results were < the soil cleanup criteria. Also in July 1991, sludge samples were collected from M1, M2, M3 and the distribution box (DB). Low levels of VOs were present, but all were < the most stringent cleanup criteria.

The system was removed in 3/93. On March 22 and 23, 1993, post-ex samples were collected (MIS1 through MIS4, MIS5 through MIS7, M13S8, M13S9 and M2S10). The samples detected PHC < 540 ppm, M3S-5 had PCE at 13 ppb and TCE at 6 ppb. MIS-5 had PCE at 15 ppb. All other parameters are below the 2/94 RDCCC and the IGWCC.

Since the 3/93 post-ex samples are below the 2/94 RDCCC and IGWCC and no discharges have occurred since, no further action is acceptable.

"NFA" Appv'd: CM Initials LLG

Date 9/14/94

Area of Concern J: PRESENT CHEMICAL STORAGE PAD (west side of bldg)

Covered and Bermed, 18x50'. Propose one sample per accessible sides for pH, VO and PHC. In 5/94, 8 samples were collected from the accessible sides of the storage pad. pH was detected 5.2 - 7.2, PHC was detected upto 1,000 ppm and VOs were ND.

Since all results were below the 2/94 RDCCC and IGWCC, no further action is acceptable.

"NFA" Appv'd: CM Initials LLG

Date 9/14/94

Area of Concern: AREA K FLOOR DRAIN

One floor drain, located in the spray room, formerly discharged to the remediated industrial wastewater treatment system. Drain will be cleaned. If integrity is breached, a sample will be collected. The drain was cleaned and the integrity verified to be sound in 5/94.

No further action is required for this area.

"NFA" Appv'd: CM Initials LLG

Date 9/14/94

Area of Concern: ABOVEGROUND

Tanks are on pads and there is no evidence of discharge.

"NFA" Appv'd: CM Initials LLG

Date 6/29/94

Area of Concern: LOADING DOCK

Loading Dock is of sound integrity and there is no evidence of discharge (6/24/94 SI).

"NFA" Appv'd: CM Initials LLG

Date 6/29/94

ENVIRONMENTAL CONCERNS TRACKING SHEET

POTENTIAL AREAS OF ENVIRONMENTAL CONCERN

Area of Concern: DUMPSTERS

Dumpsters are on pavement. The pavement is of sound integrity and there is no evidence of staining.

"NFA" Appv'd: CM Initials LLG

Date 6/29/94

Area of Concern: CHEMICAL STORAGE CABINETS

Cabinet is for flammable substances and is indoors. There was no evidence of discharge (6/29/94).

"NFA" Appv'd: CM Initials LLG

Date 6/29/94

Area of Concern: AIR VENTS

Vents are for ambient air and do not require a permit.

"NFA" Appv'd: CM Initials LLG

Date 6/29/94

Area of Concern: SINKS

Sinks are not connected to the septic. They are used to rinse the boards. Rinse water is collected and shipped to the Cumberland MUA disposal (permitted).

"NFA" Appv'd: CM Initials LLG

Date 6/29/94

Area of Concern: STORMWATER DRAINS

These drains are specifically for storm runoff and are located in the loading dock area to prevent ponding. No evidence of discharge this area (6/24/94 SI).

"NFA" Appv'd: CM Initials LLG

Date 6/29/94

Area of Concern: Baseline Ecological Evaluation

All soil contamination on site has been remediated to the NJDEP's most stringent soil cleanup criteria. There are no sensitive receptors immediately adjacent to the site. Therefore, no additional ecological evaluation is required.

"NFA" Appv'd: CM Initials MJB

Date 12/23/08

ATTACHMENT 15

No Further Action Letter and Covenant No to Sue, NJDEP to ABB, Inc., December 23, 2008



State of New Jersey
DEPARTMENT OF ENVIRONMENTAL PROTECTION

JON S. CORZINE
Governor

LISA P. JACKSON
Commissioner

December 23, 2008

Keith Knauerhase
US Environmental Counsel/Director of Env. Engineering and Sustainability
ABB, Inc.
2000 Day Hill Road
Windsor, CT 06096

No Further Action Letter and Covenant Not to Sue

Re: Remedial Action Type: Unrestricted Use for the Entire Site
The Fischer & Porter Company (F&P)
3740 N. West Blvd., Vineland City, Cumberland County
ISRA Case #E94164
Program Interest #: 026180
Block: 82, Lot: 9
ISRA Transaction: Stock Transfer, Cessation of Operations, Sale of Property
Negative Declaration Affidavit dated October 28, 2008

Dear Mr. Knauerhase:

Pursuant to N.J.S.A. 58:10B-13.1 and N.J.A.C. 7:26C, the New Jersey Department of Environmental Protection (Department) issues this No Further Action Letter and Covenant Not to Sue for the remediation of the industrial establishment specifically referenced above, so long as The Fischer & Porter Company did not withhold any information from the Department. This action is based upon information in the Department's case file and The Fischer & Porter Company's affidavit dated October 28, 2008. In issuing this No Further Action Letter and Covenant Not to Sue, the Department has relied upon the certified representations and information provided to the Department. To remain in compliance with the terms of this No Further Action Letter and to maintain the benefits of the Covenant Not to Sue, The Fischer & Porter Company as well as each subsequent owner, lessee and operator must comply with the conditions noted below.

By issuance of this No Further Action Letter, the Department acknowledges the completion of a Preliminary Assessment, Site Investigation, Remedial Investigation and/or Remedial Action pursuant to the Technical Requirements for Site Remediation (N.J.A.C. 7:26E) for the industrial establishment.

NO FURTHER ACTION CONDITIONS

Pursuant to N.J.S.A. 58:10B-12o, The Fischer & Porter Company and any other person who was liable for the cleanup and removal costs, and remains liable pursuant to the Spill Act, shall inform the Department in writing within 14 calendar days whenever its name or address changes. Any notices submitted pursuant to this paragraph shall reference the above case numbers and shall be sent to: Bureau of Case Assignment and Initial Notice- Case Assignment Section, P.O. Box 434, Trenton, N.J. 08625-0434.

COVENANT NOT TO SUE

The Department issues this Covenant Not to Sue (Covenant) pursuant to N.J.S.A. 58:10B-13.1. That statute requires a Covenant not to sue with each no further action letter. However, in accordance with N.J.S.A. 58:10B-13.1, nothing in this Covenant shall benefit any person who is liable, pursuant to the Spill Compensation and Control Act (Spill Act), N.J.S.A. 58:10-23.11, for cleanup and removal costs and the Department makes no representation by the issuance of this Covenant, either express or implied, as to the Spill Act liability of any person.

The Department covenants, except as provided in the preceding paragraph, that it will not bring any civil action against:

- (a) the person who undertook the remediation;
- (b) subsequent owners of the subject property;
- (c) subsequent lessees of the subject property; and
- (d) subsequent operators at the subject property;

for the purposes of requiring remediation to address contamination which existed prior to the date of the affidavit signed by Keith Knauerhase on October 28, 2008 for the real property at the industrial establishment identified above, payment of compensation for damages to, or loss of, natural resources, for the restoration of natural resources in connection with the discharge on the property, or payment of cleanup and removal costs for such additional remediation.

Pursuant to N.J.S.A. 58:10B-13.1d, this Covenant does not relieve any person from the obligation to comply in the future with laws and regulations. The Department reserves its right to take all appropriate enforcement for any failure to do so.

The Department may revoke this Covenant at any time after providing notice upon its determination that any person with the legal obligation to comply with any condition in this No Further Action Letter has failed to do so.

This Covenant, which the Department has executed in duplicate, shall take effect immediately once the person who undertook the remediation has signed and dated the Covenant in the lines supplied below and the Department has received one copy of this document bearing original signatures of the Department and the person who undertook the remediation.

By: R. Keith Kraus
Signature: R. Keith Kraus
Title: Environmental Counsel
Dated: 1/5/09

**NEW JERSEY DEPARTMENT OF
ENVIRONMENTAL PROTECTION**

By: Mark J. Pedersen, Bureau Chief
Signature: Maurice McLaughlin for MJP
Dated: 12/23/08

NOTICES

1. Building Interiors Not Addressed

Please be advised that the remediation that is covered by this No Further Action Letter does not address the remediation of hazardous substances that may exist in building interiors or equipment; including, but not limited to, radon, asbestos and lead. As a result, any risks to human health presented by any building interior or equipment remains. A complete building interior evaluation should be completed before any change in use or re-occupancy is considered.

2. Off-site Contamination

Please be advised that pollution in the ground water at this site exists above the Ground Water Quality Standards (N.J.A.C. 7:9C-1.7) which may limit ground water use at this site. It has been determined that this contamination is from a source unrelated to this site.

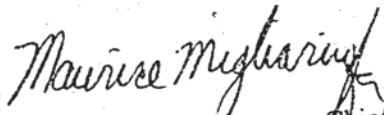
3. Administrative Consent Order or Remediation Agreement Cases

By issuance of this no further action letter the Department acknowledges that Fischer & Porter Company has fully satisfied the terms of the Remediation Agreement and the Remediation Agreement is terminated. ABB, Inc. formerly Fischer & Porter Company does not need to continue to maintain a remediation-funding source or pay the annual 1% surcharge. This notification serves to release the Self Guarantee posted by ABB, Inc.

This no further action letter does not relieve Fischer & Porter Company from the obligation to conduct future investigation or remediation activities pursuant to Federal, State or local laws for matters not addressed by this approval.

Thank you for your attention to these matters. If you have any questions, please contact Michael Buriani at (609) 633-1425.

Sincerely,



Mark J. Pedersen, Bureau Chief
Bureau of Industrial Site Remediation

c: Carol Gross, Esq.
Cumberland County Health Dept.
City of Vineland Dept of Health
Municipal Clerk, Vineland
Kirstin Hahn, NJDEP BC&IN
Linda Cullen, NJDEP BEI
George Nicholas, BGWPA
Donna Gaffigan, Bureau of Case Management
Frank Sorce, Bureau of Environmental Measurements and Site Assessment
Michael E. McMahon, Dept. of Law and Public Safety, Division of Law

ATTACHMENT 16

*NCO Financial Systems, Inc., Property Report, Fischer & Porter, 3740 North West Boulevard,
Vineland, NJ 08360, April 8, 2010.*

April 8, 2010

Mr. Paul Cristalli
EDR
440 Wheelers Farms Road
Milford, CT 06460

Subject: REFERENCE #: 2732515.3
FISCHER & PORTER
3740 NORTH WEST BLVD.
VINELAND, NJ 08360

Dear Mr. Cristalli:

Public records on the subject real property identified above revealed the following information effective to March 30, 2010:

PROPERTY REPORT

ASSESSMENT

Location: Cumberland County

Land/Description: Parcel of Land
Block 501, Lot 29

DEEDS

1

Grantee(s): C & C Investments, a New Jersey partnership
(Buyer)

Grantor(s): Fischer & Porter Company, a corporation of the State of
(Seller) Pennsylvania

Conveys: Parcel of Land

Date Executed: August 28, 1996
Date Recorded: September 4, 1996
DBV/PG: 2194/160

NOTE: Copy attached as Exhibit "A."



2

Grantee(s): **Fischer & Porter Company, a Pennsylvania corporation**
(Buyer)

Grantor(s): **Andrews Glass Company, a corporation of the State of New Jersey**
(Seller)

Conveys: Parcel of Land

Date Executed: April 18, 1985
Date Recorded: April 22, 1985
DBV/PG: 1550/100

3

Grantee(s): **Andrews Glass Company, a corporation of the State of New Jersey**
(Buyer)

Grantor(s): **E. Roger Jones and Helen G. Jones, his wife**
(Seller)

Conveys: Parcel of Land

Date Executed: February 9, 1971
Date Recorded: February 16, 1971
DBV/PG: 1177/136

4

Grantee(s): **E. Roger Jones and Helen G. Jones, his wife**
(Buyer)

Grantor(s): **Sidney Sweetman, Executor of the Last Will and Testament of**
(Seller) **James Sweetman, deceased**

Conveys: Parcel of Land

Date Executed: July 13, 1960
Date Recorded: July 14, 1960
DBV/PG: 940/396

EXAMINER'S NOTE

Public records of Cumberland County, New Jersey were searched from January 1, 1940 to March 30, 2010, and no other deeds vesting title in the subject property were found of record during the period searched. James Sweetman owned the property prior to 1940.



LEGAL DESCRIPTION

Legal Description included on Exhibit "A."

We hope this information assists in your decision making process. If we can be of additional assistance, please do not hesitate to contact us at your convenience.

Cordially,

NCO FINANCIAL SYSTEMS, INC.
FINANCIAL INVESTIGATIVE SERVICES

Stewart Dowouis
Title Analyst

sd
cc: Chris Naquin

NCO File #822000

TERMS AND CONDITIONS

USE OF THIS REPORT: THIS REPORT CONTAINS INFORMATION OBTAINED FROM PUBLIC LAND RECORDS AND NCO FINANCIAL SYSTEMS, INC. - FINANCIAL INVESTIGATIVE SERVICES MAKES NO REPRESENTATION CONCERNING THE ACCURACY OF SAID PUBLIC RECORD INFORMATION OR THE INFORMATION CONTAINED IN THIS REPORT. THIS REPORT IS NOT AN ABSTRACT OR OPINION OF TITLE, TITLE COMMITMENT OR GUARANTEE, OR TITLE INSURANCE POLICY. THIS REPORT IS PROVIDED TO YOU AS A NCO FINANCIAL SYSTEMS, INC. - FINANCIAL INVESTIGATIVE SERVICES CUSTOMER AND IS NOT INTENDED FOR BENEFIT OF ANY THIRD PARTY.

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EXHIBIT A

109853-7

106902

BK2194PG160

104-DEED - BARGAIN AND SALE (Covenant as to Grantor's Act)
CORP TO IND. OR CORP - Plain Language

RV 2-2

Copyright © 1982 By ALL-STATE LEGAL SUPPLY CO.
One Commerce Drive, Clarks Summit, N.J. 07015**DEED**

Prepared by: (Print signer's name below signature)

Noreen M. English
Noreen M. EnglishThis Deed is made on AUGUST 28, 19 96

BETWEEN

FISCHER & PORTER COMPANY

a corporation of the State of Pennsylvania
having its principal office at 125 East County Line Road, Warminster, Pennsylvania
referred to as the Grantor.

AND

C & C INVESTMENTS,

a New Jersey partnership

whose post office address is 410 South Fourth Street, Vineland, New Jersey
The word "Grantee" shall mean all Grantees listed above.

Transfer of Ownership. The Grantor grants and conveys (transfers ownership of) the property described below to the Grantee. This transfer is made for the sum of Four Hundred Twenty-Five Thousand and 00/100 Dollars (\$425,000.00)

The Grantor acknowledges receipt of this money.

Tax Map Reference. (N.J.S.A. 46:15-2.1) Municipality of Vineland
Block No. 82 Lot No. 9 Account No.
☐ No property tax identification number is available on the date of this Deed. (Check box if applicable.)

Property. The property consists of the land and all the buildings and structures on the land in the City of Vineland and State of New Jersey. The legal description is:

BEING DESCRIBED AS FOLLOWS:

All that certain land and premises situate lying and being in the City of Vineland, County of Cumberland, State of New Jersey, bounded and described as follows:

TRACT NO. 1: BEGINNING at a point in the curved westerly right of way of the West Jersey and Seashore Railroad at a chord distance of 760.98 feet on a bearing of North 1 degree 9 minutes West of the center line of Weymouth Road, said point being the Southeast corner of lands of Robert Forgnoni as recorded in Deed Book 837, Page 94; said point being in the easterly line of Northwest Boulevard (66 feet wide) and extends thence (1) North 86 degrees 15 minutes West partly along the South line of the said Robert Forgnoni property as recorded in Deed Book 837, Page 94, 435 feet to a point; thence (2) South 1 degree 09 minutes East, 300 feet to a point; thence (3) South 86 degrees 15 minutes East, 435 feet to a point in the chord at or near said westerly right of way; thence (4) North 1 degree 9 minutes West, along said chord 300 feet to a point in the curved West right of way line of said Railroad and the place of Beginning.

TRACT NO. 2: BEGINNING at a concrete stone in the Northwest corner of E. Roger Jones property said point being 568 feet North 86 degrees 15 minutes West of the westerly right of way line of Pennsylvania-Reading Sea Shore lines and 799.82 feet North 13 degrees 10 minutes East of the center line of Weymouth Road; thence (1) South 96 degrees 15 minutes East along said Jones' North line 422 feet to a concrete stone; thence (2) South 4 degrees 15 minutes East 60 feet to a point; thence (3) South 86 degrees 15 minutes East 180 feet to a westerly property line of Northwest Railroad Blvd.; thence (4) Southwardly along the westerly property line of Northwest Railroad Boulevard, 30 feet to a point; thence (5) North 86 degrees 15 minutes West, 180 feet to a point; thence (6) South 4 degrees 15 minutes East, 90 feet to a point; thence (7) North 86 degrees 15 minutes West, 189 feet to a point; thence (8) South 01 degrees 09 minutes East, 300 feet to a point; thence (9) South 75 degrees 08 minutes West, 54.30 feet to a point; thence (10) North 76 degrees 50 minutes West, 310 feet to a point; thence (11) North 13 degrees 10 minutes East, 449.82 feet to a point and place of Beginning.

TOGETHER with that certain easement bounded and described as follows: BEGINNING at a point in the westerly line of the Right of Way of West Jersey and Seashore Railroad at the distance of 460.98 feet Northwardly from the intersection of the said Westwardly side of said railroad Right of Way with the center line of Weymouth Road; thence (1) North 86

Consideration: \$ 425,000.00 Exempt Code: 5

County	State	M.P.N.R.F.	Total
425.43	1962.97	412.58	1980.98
Jen	Date: 09/04/1996		

(continued)

SCHEDULE 1

BEGINNING at point for a corner in the curved Westerly Right of Way line of the Conrail, Pennsylvania-Reading Sea Shore Lines, Millville Branch, (said line also being the Easterly line of Northwest Boulevard - 66 feet wide) at a chord distance of 460.79 feet on a bearing of North 00 degrees 52 minutes 31 seconds West, from its intersection with the centerline of Weymouth Road (50 feet wide), said point being the Northeast corner of Lot 10 of Block 82 as shown on the Tax Map of the City of Vineland, and running; THENCE

1) North 86 degrees 15 minutes 00 seconds West, along the Northerly line of the said Lot 10, and passing over a nail and washer found 65.66 feet from the beginning of this course, and also passing over an iron pin found on this line in the division line between the said Lot 10 and Lot 11 of Block 82, a total distance of 437.15 feet to a concrete monument found for a corner in the Northerly line of the said Lot 11; THENCE

2) South 75 degrees 08 minutes 00 seconds West, along the said Northerly line of Lot 11, a distance of 54.30 feet to a concrete monument found for a corner in the Northerly line of Lot 12 of the said Block 82; THENCE

3) North 76 degrees 50 minutes 00 seconds West, along the said Northerly line of Lot 12, a distance of 310.00 feet to a concrete monument found for a corner in the Easterly line of Lot 13 of the said Block 82; THENCE

4) North 13 degrees 10 minutes 00 seconds East, along the said Easterly line of Lot 13, a distance of 449.82 feet to a concrete monument found for a corner in the Southerly line of Lot 47 of the said Block 82; THENCE

5) South 86 degrees 15 minutes 00 seconds East, along the said Southerly line of Lot 47 and also along Lot 5 of Block 82, a distance of 422.00 feet to a point for a corner in the Westerly line of Lot 7 of the said Block 82, said point being 0.64 feet east of and 0.28 feet South of a found concrete monument; THENCE

6) South 04 degrees 15 minutes 00 seconds East, along the said Westerly line of Lot 7, a distance of 60.00 feet to a point for a corner, said point being 0.24 feet South of and 0.63 feet east of a nail found in a stump; THENCE

7) South 86 degrees 15 minutes 00 seconds East, along the Southerly line of the said Lot 7, a distance of 165.20 feet to the curved Westerly line of Northwest Boulevard; THENCE

8) along a curve, curving to the right and having a radius of 7534 feet more or less, an arc distance of 30.11 feet to a point for a corner in the Northerly line of Lot 8 of the said Block 82; THENCE

9) North 86 degrees 15 minutes 00 seconds West, along the said Northerly line of Lot 8, a distance of 165.99 feet to a point for a corner, said point being 0.43 feet South of and 0.58 feet East of a found concrete monument; THENCE

BK2194PG162

10) South 04 degrees 15 minutes 00 seconds East, along the said Lot 8, a distance of 90.00 feet to a point for a corner, said point being 0.40 feet East of and 0.23 feet North of a found concrete monument; THENCE

11) South 86 degrees 15 minutes 00 seconds East, along the Southerly line of the said Lot 8 and crossing the Westerly line of Northwest Boulevard, a total distance of 234.43 feet to a point for a corner in the aforesaid curved Westerly Right of Way Line of the Conrail, Pennsylvania-Reading Sea Shore Lines, Millville Branch; THENCE

12) along a curve, curving to the right and having a radius of 7600 feet more or less, an arc distance of 301.50 feet to the POINT of BEGINNING;

CONTAINING 7.09 acres of land, more or less;

TOGETHER WITH that certain easement bounded and described as follows:
BEGINNING at a point in the Curved Westerly line of the Right of Way of the Conrail, Pennsylvania - Reading Sea Shore Lines, Millville Branch, at a distance of 450.79 feet on a bearing of North 00 degrees 52 minutes 31 seconds West, from the intersection of the said Curved Westerly line and the centerline of Weymouth Road (50 feet wide), and running; THENCE

1) North 86 degrees 15 minutes 00 seconds West, along the Northerly line of Lot 10 of Block 82, a distance of 402.15 feet to a point; THENCE

2) North 86 degrees 15 minutes 00 seconds West, 10 feet to a point; THENCE

3) South 01 degree 09 minutes East, between two parallel lines 10 feet apart to a stream known as Manaway Branch.

BEING SUBJECT TO the rights of the public for the Right of Way of Northwest Boulevard;

BEING SUBJECT TO any other easements or restrictions of record;

BEING lot 9 of Block 82 as shown on the Tax Map of the City of Vineland.

The above description has been prepared based on a survey performed by C & S ENGINEERS, INC. in accordance with N.J.A.C. 13:40-5.

Dated: July 29, 1996

Grantor makes no representation as to the description contained in this Schedule 1.

SCHEDULE 1 cont'd
Page 2 of 2

BK2194PG163

degrees 15 minutes West 400 feet to a corner; thence (2) North 86 degrees 15 minutes West 10 feet to a corner; thence (3) South 1 degree 9 minutes East between 2 parallel lines 10 feet apart to a stream known as Manaway Branch.

BEING Lot 9, Block 82, City of Vineland Tax Map.

BEING the same land and premises which became vested in Fischer & Porter Company, a Pennsylvania Corporation, by Deed from Andrews Glass Company, a New Jersey corporation, dated 4/18/85 and recorded 4/22/85 in Deed Book 1550, Page 100.

BEING known as the street address 3740 Northwest Boulevard, Vineland, New Jersey.

SUBJECT to easements and restrictions of record, if any.

BEING ALSO DESCRIBED AS FOLLOWS:

(See Schedule 1 attached hereto and made a part hereof).

Promises by Grantor. The Grantor promises that the Grantor has done no act to encumber the property. This promise is called a "covenant as to grantor's acts" (N.J.S.A. 46:4-6). This promise means that the Grantor has not allowed anyone else to obtain any legal rights which affect the property (such as by making a mortgage or allowing a judgment to be entered against the Grantor).

Signatures. This Deed is signed and attested to by the Grantor's proper corporation of the date at the top of the first page. Its corporate seal is affixed.

Attested by:

Catherine A. Kroll
CATHERINE A. KROLL, ASST. Secretary

FISCHER & PORTER COMPANY
By: *Gordon D. Woolbert*
Gordon D. Woolbert
Chief operating Officer

STATE OF NEW JERSEY, COUNTY OF CAMDEN
I CERTIFY that on AUGUST 28, 1996

CATHERINE A. KROLL

personally came before me and this person acknowledged under oath, to my satisfaction, that:

- this person is the ASST secretary of FISCHER & PORTER COMPANY the corporation named in this Deed;
- this person is the attesting witness to the signing of this Deed by the proper corporate officer who is GORDON D. WOOLBERT, the Chief operating Officer of the corporation;
- this Deed was signed and delivered by the corporation as its voluntary act duly authorized by a proper resolution of its Board of Directors;
- this person knows the proper seal of the corporation which was affixed to this Deed;
- this person signed this proof to attest to the truth of these facts; and
- the full and actual consideration paid or to be paid for the transfer of title is \$425,000.00.

Signed and sworn to before me on AUGUST 28, 1996

RICHARD E. OWENS
NOTARY PUBLIC OF NEW JERSEY
MY COMMISSION EXPIRES JANUARY 1, 1998

Catherine A. Kroll
CATHERINE A. KROLL, ASST SECRETARY

BK2194 PG164

In compliance with the statute, I
have presented an abstract of the
within deed to the Assessor of the
taxing district therein mentioned.

GLORIA NOTO
Cumberland County Clerk

DEED

FISCHER & PORTER COMPANY

TO

C & C INVESTMENTS

Grantor,

Grantee.

Dated: *August 28*, 1996

Record and return to:

Mark H. Watson, Esq.
213 White Horse Pike
P.O. Box 267
Haddon Heights, New Jersey 08035

By mail
BEACON TITLE SERVICES AGENCY INC
727 LANDIS AVENUE
P.O. BOX 368
VINELAND, NJ 08360

110013
96 11822
ADMITTED TO RECORD
CUMBERLAND COUNTY, N.J.

96 SEP -4 AM 9:05

Gloria Noto
CLERK

DEED BY *2944* PAGE *164*

BT-7729

ATTACHMENT 17

*NJDEP Work Plan for Site Investigation, Jamar Laundry, N. West Blvd & Weymouth Road,
undated, (post August 2003).*

3600 North West Blvd.

rev. 8/03

WORK PLAN FOR SITE INVESTIGATION

SITE NAME: Jamar Laundry

JOB NUMBER: A192800P

ACTIVITY CODE: V45C

ADDRESS: N. West Blvd & Weymouth Road

MUNICIPALITY: Vineland

COUNTY: Cumberland

EPA ID NUMBER:

ACCESS GRANTED ? NOT YET

SITE CONTACT(S): Jim Marcacci

PHONE: 856-696-5777

AERIAL PHOTOS REVIEWED ? Yes

BACKGROUND INFORMATION:

Jamar Groceries, Inc. is a grocery store located at the corner of Weymouth Road and No. West Boulevard in Vineland. In the past, there was a coin operated laundry at the same address. Current owners

PURPOSE OF WORKPLAN:

**Jamar Laundry
No. West Boulevard
Vineland City, Cumberland County**



300 0 300 600 900 Feet



ATTACHMENT 18

*June 13, 1997 Final Site Inspection Prioritization Report, Newfield Landfill, Newfield Borough, Gloucester County, New Jersey; Prepared by Region II Superfund Technical Assessment and Response Team for the United States Environmental Protection Agency
(portions)*

INITIAL REVIEW
DATE
BY

**FINAL
SITE INSPECTION PRIORITIZATION REPORT
NEWFIELD LANDFILL
NEWFIELD BOROUGH, GLOUCESTER COUNTY, NEW JERSEY**

DATE 06/03/97

CERCLIS ID No. NJD980505556

DATE 06/03/97

VOLUME I OF II

SA/53

DATE 06/03/97
BY

EPA Contract No. 68-W5-0019
TDD No.: 02-96-11-0018
Document Control No. START-02-F-00833

DATE 06/03/97

JUNE 1997

DATE 06/03/97
BY

**Prepared for:
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY**

DATE 06/03/97
BY
Assessment
Region II
Superfund
Technical
Assessment
And Response
Team

**Prepared by:
Roy F. Weston, Inc.
Federal Programs Division
Edison, New Jersey 08837**



**FINAL
SITE INSPECTION PRIORITIZATION REPORT
NEWFIELD LANDFILL
NEWFIELD BOROUGH, GLOUCESTER COUNTY, NEW JERSEY**

CERCLIS ID No.: NJD980505556

Prepared by:
Region II Superfund Technical Assessment and Response Team
Roy F. Weston, Inc.
Federal Programs Division
Edison, New Jersey

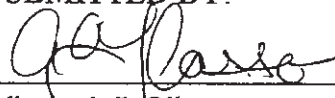
prepared for:

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

EPA Contract No.: 68-W5-0019
TDD No.: 02-96-11-0018
Document Control No.: START-02-F-00833

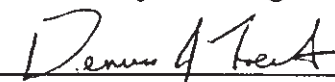
JUNE 1997

SUBMITTED BY:



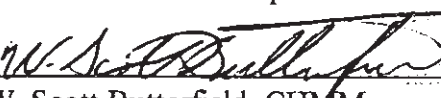
Alizabeth J. Olhasso
START Project Manager

Date 6/13/97



Dennis J. Foerter, CHMM
Site Assessment Group Leader

Date 6/13/97



W. Scott Butterfield, CHMM
Site Assessment Team Leader

Date 6/13/97

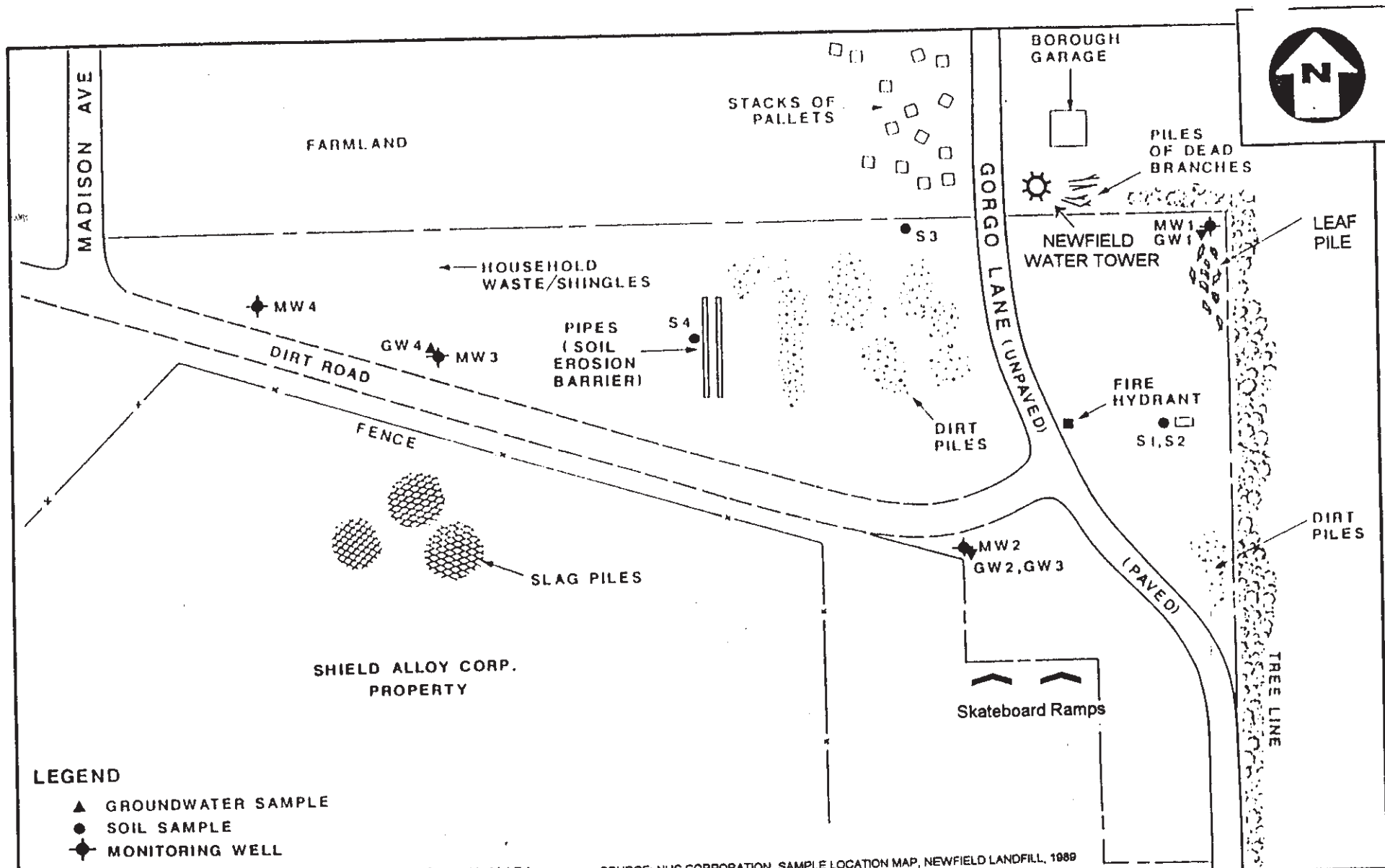
SITE SUMMARY

The Newfield Landfill site (CERCLIS ID No. NJD980505556) is an inactive municipal landfill located on Gorgo Lane between Catawba Avenue and Weymouth Road in Newfield Borough, Gloucester County, New Jersey (Ref. No. 1, p. 2). The site is located in the southeast corner of the Borough of Newfield, in a sparsely populated residential and commercial area which consists of a mix of small farms, private residences, industrial, and light commercial properties. The site is adjacent to the northern side of the old Pennsylvania-Reading Railroad Line (Ref. No. 1, pp. 2, 5). The property is a generally level, vacant lot with no buildings or structures (Ref. No. 1, p. 2). The site is approximately 28.86 acres in size and is bordered to the west and southwest by Shieldalloy Metallurgical Corporation (Shieldalloy), a National Priorities List (NPL) site, to the north by an inactive farm, a residence, and the Newfield Borough Water Tower, to the east by a wooded area, and to the south by light commercial properties (Ref. Nos. 1, p. 2; 10, p. 3). The Landfill was permitted to accept municipal waste (household and commercial), bulky waste (except appliances, trees, automobiles, and large vehicle parts and tires), vegetative waste (limited to leaves and trees processed through a wood chipper) and waste glass (Ref. No. 1, pp. 2, 42). There is no evidence of any hazardous wastes having been deposited in the landfill (Ref. No. 1, p. 3). Figures 1 and 2 present a Site Location Map and Site Map, respectively.

The 28.86-acre landfill consists of two sections, the original site (19 acres), and the extension (9.86 acres). The original portion of the landfill was purchased from Mr. Gorgo by the Borough of Newfield in 1972 (Ref. No. 1, pp. 2, 5). The landfill has no liner, and no leachate collection system (Ref. No. 1, pp. 5, 197, 198). When the property was purchased, it contained a gravel pit approximately 10 to 12 feet deep. The land for the extension was leased by the borough some time between 1972 and 1978. In December 1979 the landfill was closed by the borough. However, the borough continued to deposit leaves and wood at the site. The borough also allowed local contractors to dispose waste concrete in the landfill (Ref. No. 1, pp. 2, 5). There is no fencing or means of security at the site (Ref. No. 1, p. 3).

Wastes deposited on site included household and municipal waste, bulk waste such as concrete and wood, waste glass, and vegetative waste consisting of leaves and brush (Ref. No. 1, pp. 2, 3). In 1976, several hundred bushels of a white powdered substance was disposed on site (Ref. Nos. 1, pp. 3, 5; 7 p. 1). The substance was removed from the landfill and disposed off site. A chemical analysis of the material indicated that the substance was predominantly a mixture of salts in the following percentages: sulfate, 18%; magnesium, 0.74%; chloride, 15.2%; potassium, 14%; sodium, 20%, lead, 0.025%; aluminum, 0.005%, silicon, 0.013%; and boron, 1% (Ref. No. 1, pp. 5, 77). Between 1972 and 1978, the landfill accepted a large quantity of waste glass from Owens-Illinois Inc. (Ref. Nos. 1, pp. 3, 5; 6, pp. 3, 4). A detailed description of waste sources is presented in Part II (Waste Source Information) of this report.

In May 1982, the New Jersey Department of Environmental Protection (NJDEP) granted permission for the borough to continue depositing concrete, leaves, and brush in the landfill to bring the site up to grade so that the site could be properly closed. In October 1984, the borough



WESTON
MANAGEMENT INC. SPECIALIZING IN LANDFILL

Roy F. Weston, Inc.
FEDERAL PROGRAMS DIVISION

IN ASSOCIATION WITH RESOURCE APPLICATION, Inc.
C.C. JOHNSON & MALHOTRA, P.C., R.E. BARRIERA ASSOCIATES,
PRC ENVIRONMENTAL MANAGEMENT, AND GRB ENVIRONMENTAL SERVICES, INC.

EPA PM

Amy Brochu

START PM

Alizabeth Olhasso

Figure 2

Newfield Landfill
02-96-11-0018

was issued an interim New Jersey Pollutant Discharge Elimination System (NJPDES) permit No. NJ0054399 to install monitoring wells and conduct quarterly sampling of groundwater (Ref. No. 1, pp. 2, 85-97). The borough failed to begin testing within the required time and was issued a notice of violation in May 1985 (Ref. No. 1, pp. 2, 99-101). The borough stopped testing groundwater at the site in April 1988, after allowing the NJPDES permit to expire (Ref. Nos. 1, p. 2; 8, pp. 1-4; 9, pp. 1-6). The NJDEP sent violation notices in May 1988 and March 1989 to the Borough of Newfield for failing to conduct groundwater monitoring (Ref. No. 9, pp. 1-6). In May 1988 and again in February 1989 the Borough asked for relief from testing on the basis that no groundwater contamination attributed to the landfill had been detected in the four previous years of testing (Ref. No. 1, p. 2, 105, 106). In a letter from the NJDEP, Division of Water Resources, as of April 19, 1989, the NJPDES permit for Newfield Landfill was determined to be invalid, and the borough was no longer required to conduct groundwater monitoring (Ref. No. 2, p. 1).

In October 1985, the borough received a letter from the Gloucester County Health Department (GCHD) stating that the landfill was no longer a registered facility, and disposal at the site must cease. Inspections by the GCHD and the NJDEP indicated that the borough had consistently failed to adequately cover refuse disposed of at the landfill (Ref. Nos. 1 pp. 2, 3, 108-150; 3, pp. 1-30). In June 1987 during an NJDEP site inspection a violation was issued to a contractor in a truck who was disposing refuse at the landfill (Ref. No. 1, p. 134).

An inspection conducted by the Environmental Protection Agency (EPA) on December 10, 1979 found evidence of burned wooden pallets on the western portion of the landfill. Further EPA inspections in April 1980 and 1981, indicated that there were leachate ponds on site, refuse remained exposed, and the landfill was improperly graded (Ref. No. 1, pp. 3, 55-58).

NUS Corporation Region II Field Investigation Team (FIT) performed a site inspection of the Newfield Landfill on March 14, 1989. During the inspection, four groundwater samples and four soil samples were collected. Analyses of the groundwater samples indicated that no release of contaminants attributable to the site has occurred. Analyses of the soil samples indicated the presence of several polyaromatic hydrocarbon (PAH) compounds (Ref. No. 1, pp. 247, 255, 325-327). A detailed description of sampling activities is presented in Part III (Sampling Results) of this report.

The Region II Superfund Technical Assessment and Response Team personnel performed an on-site reconnaissance of the Newfield Landfill on February 18, 1997. Evidence of illegal disposal was noted on site including a discarded tire. Evidence of children playing on the Newfield Landfill site was also noted during the inspection. START personnel observed what appeared to be skateboard ramps at the edge of the landfill property. During the site reconnaissance, radiation that appeared to be migrating from the direction of the neighboring Shieldalloy site was detected at 17 ur/hr, more than three times the background reading of 4 r/hr, and Region II START personnel retreated to their vehicle. Increased radiation levels of greater than 40 ur/hr were detected when Region II START personnel drove in the direction of the Shieldalloy slag piles in order to exit the Newfield Landfill site. The general wind direction during the reconnaissance was noted to be from the southwest, blowing from Shieldalloy toward the Newfield Landfill (Ref. No. 10, pp. 1-5).

June 13, 1997

The Shieldalloy site (NJD002365930), placed on USEPA's National Priorities List (NPL) in 1984, is located adjacent to the southwest border of the Newfield Landfill site. The Shieldalloy facility, which consists of approximately 67.5 acres, has been in operation since 1955, processing ores and minerals to produce primary metals, specialty metals and ferroalloys. The principal production processes include aluminothermic and reduction smelting of ores which produce metal slag and other by-products. Raw materials have included oxides of chromium, columbium, boron, vanadium, calcium, aluminum metal, strontium metal, zirconium metal, steel, iron, nickel, silicon, magnesium, manganese, chrome, and fluoride salts. Areas of concern include by-product storage areas including radioactive slag piles regulated by the NRC, wastewater lagoons, underground storage tanks, and titanium metal degreasing operation areas. Groundwater contamination in the Newfield area, including chromium and volatile organic compounds, has been attributed to the Shieldalloy site. Drinking water wells downgradient and within 0.25-mile of the site have been closed due to contamination, including a municipal well (Ref. No. 5, pp. 1-8).

SITE ASSESSMENT REPORT: SITE INSPECTION PRIORITIZATION

PART I: SITE INFORMATION

1. Site Name/Alias Newfield Landfill
Street Gorgo Lane between Catawba Avenue and Weymouth Road
City Newfield State NJ Zip 08344
2. County Gloucester County Code 015 Cong. Dist. Unknown
3. CERCLIS ID NO. NJD980505556
4. Block No. Block 7, 25, and 26 Lot No. 2D, 17-18-19-19A and 20, 8A and 9
5. Latitude 39° 32' 29" N Longitude 75° 00' 51" W
USGS Quad(s). Newfield, NJ
6. Approximate size of site 28.86 acres
7. Owner Newfield Borough Telephone No. (609) 358-0712
Street P.O. Box 856
City Newfield State New Jersey Zip 08344
8. Operator Newfield Borough Telephone No. _____
Street See Above
City _____ State _____ Zip _____
9. Type of Ownership

<input type="checkbox"/> Private	<input type="checkbox"/> Federal	<input type="checkbox"/> State
<input type="checkbox"/> County	<input checked="" type="checkbox"/> Municipal	<input type="checkbox"/> Unknown <input type="checkbox"/> Other _____

June 13, 1997

10. Owner/Operator Notification on File

☐ RCRA 3001 ☐ Date ☐ CERCLA 103c Date ☐

☒ None ☐ Unknown

11. Permit Information

Permit	Permit No.	Date Issued	Expiration Date	Comments
NJPDES	NJ0054399	October, 1984	April 19, 1989	---

12. Site Status

☐ Active ☒ Inactive ☐ Unknown

13. Years of Operation: 1972 to 1979

14. Identify the types of waste sources (e.g., landfill, surface impoundment, piles, stained soil, above- or below-ground tanks or containers, land treatment, etc.) on site. Initiate as many waste unit numbers as needed to identify all waste sources on site.

(a) Waste Sources

Waste Unit No.	Waste Source Type	Facility Name for Unit
1	<u>Landfill</u>	<u>Original Site</u>
2	<u>Landfill</u>	<u>Extension</u>

(b) Other Areas of Concern

There are no other areas of concern present at the Newfield Landfill Site.

15. Describe the regulatory history of the site, including the scope and objectives of any previous response actions, investigations and litigation by State, Local and Federal agencies (indicate type, affiliation, date of investigations).

- Hazardous Waste Site Investigation, EPA, December 10, 1979.
- Potential Hazardous Waste Site Inspection Report, EPA, December 12, 1979.
- Inspection of Solid Waste Disposal Area, NJDEP, 11 inspections in 1980.
- Potential Hazardous Waste Site Identification and Preliminary Assessment, EPA, April 7, 1980.
- Potential Hazardous Waste Site Tentative Disposition, EPA, April 30, 1981.
- Inspection Report, Sanitary Landfill, GCDOH, September 22, 1983, June 1, 1984,

September 30, 1986.

- Issuance of NJPDES Permit NJ0054399, NJDEP, October 15, 1984.
- NJPDES/DGW Permit Violation, NJDEP, May 7, 1985.
- Health Violation, GCDOH, June 15, 1987.
- Closed Landfill Monitoring Record, GCDOH, June 15, 1987, September 3, 1987, December 2, 1987, February 8, 1988, March 4, 1988, June 24, 1988, August 12, 1988, September 22, 1988, October 14, 1988, November 28, 1988, December 22, 1988.
- Compliance Evaluation Inspection Violation, NJDEP, May 31, 1988, March 21, 1989.
- On-Site Reconnaissance, NUS Corporation, February 23, 1989.
- Sampling Trip, NUS Corporation, March 14, 1989.
- Site Inspection, NUS Corporation, Superfund Division, September 15, 1989.

- a) Is the site or any waste source subject to Petroleum Exclusion? Identify petroleum products and by products that justify this decision.

A review of available background information indicates that neither the site nor any waste sources on site are subject to Petroleum Exclusion.

- b) Are pesticides produced and stored on site? Does the facility apply pesticides (FIFRA) or Federal Insecticide, Fungicide, and Rodenticide Act) to any part of the property?

Pesticides are not expected to have been stored or used on site while the property was operated as a municipal landfill.

- c) Is the site or any waste source subject to RCRA Subtitle C (briefly explain)?

Neither the site nor any waste sources on site are subject to RCRA Subtitle C.

- d) Is the site or any waste source maintained under the authority of the Nuclear Regulatory Commission (NRC)?

Neither the site nor any waste sources on site are maintained under authority of the Nuclear Regulatory Commission. Radiation levels more than three times background were measured during an on-site reconnaissance conducted by Region II START on February 18, 1997. Based on the general wind direction noted during reconnaissance activities, radiation appeared to be emanating from the slag piles located on the Shieldalloy property, located adjacent to the southwest border of the Newfield Landfill. Operations on the Shieldalloy property are regulated by the NRC.

Ref. Nos. 5, p. 4; 19, pp. 1-5

June 13, 1997

16. Do any conditions exist on site which would warrant immediate or emergency action?

During the on-site reconnaissance conducted by Region II START on February 18, 1997, no conditions were noted to exist on site which would warrant immediate or emergency action.

17. Information available from:

Contact Amy Brochu Agency U.S. EPA Telephone No.: (908) 906-6802
Preparer Alizabeth Olhasso Agency Region II START Date: 6/13/97

June 13, 1997

PART II: WASTE SOURCE INFORMATION

For each of the waste units identified in Part I, complete the following items.

Waste Unit 1 - Original Site

Source Type

<u> X </u>	Landfill	<u> </u>	Contaminated Soil
<u> </u>	Surface Impoundment	<u> </u>	Pile
<u> </u>	Drums	<u> </u>	Land Treatment
<u> </u>	Tanks/Containers	<u> </u>	Other

Description:

The original portion of the Newfield Landfill site (19 acres) has been in operation since the borough acquired it in 1972. At that time, the site was a gravel pit approximately 10 to 12 feet deep. The areal dimensions of the pit are unknown. The landfill was permitted to accept municipal waste (household and commercial), bulky waste (except appliances, trees, automobiles, and large vehicle parts and tires), vegetative waste (limited to leaves and trees processed through a wood chipper) and waste glass (from Owens-Illinois, Inc.). The landfill has no liner or leachate collection system, and has not been capped with any impermeable material. The original portion of the Newfield Landfill has been covered with soil and graded. In 1976 several hundred bushels of a white powdered substance were disposed on the Newfield Landfill. The material was removed, and disposed off-site. A chemical analysis of the material conducted by the NJDEP indicated that the substance was a mixture of salts.

During a site reconnaissance conducted by NUS Corporation Region II FIT personnel on February 23, 1989, a single empty drum was found resting on the covered and graded portion of the landfill. The drum was determined to be a result of illegal dumping. Two soil samples were collected by the NUS personnel at the drum site. Analyses of the samples did not indicate the presence of any hazardous contaminants.

Ref. Nos. 1, pp. 2, 3, 5, 77; 6, pp. 3, 4; 7, p. 1

Hazardous Waste Quantity

Approximately 6.5 acres of the original portion of the landfill have been used for waste disposal; however, there is no evidence of any hazardous wastes having been disposed of in the landfill.

Ref. No. 1, p. 5

Hazardous Substances/Physical State

Analytical results from samples collected during the NUS Corporation site inspection, March 14, 1989, indicate that no release of contaminants to groundwater or soil attributable to the site has occurred.

Ref. No. 1, pp. 5, 247-359

PART II: WASTE SOURCE INFORMATION

For each of the waste units identified in Part I, complete the following items.

Waste Unit 2 - Landfill Extension

Source Type

<u>X</u>	Landfill	_____	Contaminated Soil
_____	Surface Impoundment	_____	Pile
_____	Drums	_____	Land Treatment
_____	Tanks/Containers	_____	Other

Description:

The extension portion of the landfill which is 9.86 acres, was leased by the Borough of Newfield some time between 1972 and 1978. The Newfield Landfill extension lies adjacent to the western boundary of the original portion of the landfill. The landfill was permitted to accept municipal waste (household and commercial), bulky waste (except appliances, trees, automobiles, and large vehicle parts and tires), vegetative waste (limited to leaves and trees processed through a wood chipper) and waste glass (from Owens-Illinois, Inc.). The landfill has no liner or leachate collection system, and has not been capped with any impermeable material.

Ref. Nos. 1 pp. 2, 3, 5; 6, pp. 3, 4

Hazardous Waste Quantity

Approximately 2.2 acres of the extension portion of the landfill have been used for waste disposal; however, there is no evidence of any hazardous wastes having been disposed of in the landfill.

Ref. No. 1, p. 5

Hazardous Substances/Physical State

Analytical results from samples collected during the NUS Corporation site inspection, March 14, 1989, indicate that no release of contaminants to groundwater attributable to the site has occurred. Soil samples taken next to the soil erosion pipes indicated the presence of several PAH compounds.

Ref. No. 1, pp. 5, 247-359

PART III: SAMPLING RESULTS

EXISTING ANALYTICAL DATA

Since 1979, the Borough of Newfield has been required to conduct quarterly sampling of monitoring wells on the Newfield Landfill property in compliance with NJPDES permit No. NJ0054399. A summary of substances detected outside of permit limits for three sampling events conducted in January 1986, 1987, and 1988 was compiled by NUS Corporation. Samples were collected and analyzed by Quality Control Labs Inc., a New Jersey-certified laboratory. The locations of the monitoring wells are indicated on Figure 2. The only contaminant detected above permit limits, and attributable to the site is iron. Levels of iron more than three times background were detected in MW-3 (48,200 parts per billion [ppb]) and MW-4 (42,400 ppb) in the January 1986 sampling event; and were also detected in MW-2 (1,290 ppb), MW-3 (750 ppb), and MW-4 (320 ppb) in the January 1988 sampling event. These levels of iron are commonly found in municipal landfills (Ref. No. 1, p. 4, 361-397).

During the March 14, 1989 Site Inspection conducted by NUS Corporation Region II FIT, a total of eight aqueous samples and four soil samples were collected including three aqueous rinsate blanks and a trip blank. These samples were all analyzed (except for the trip blank) for Target Compound List organic and inorganic contaminants, excluding cyanide, through the U.S. EPA Contract Laboratory Program (CLP). The trip blank was analyzed for volatile organic compounds only (Ref. 1, pp. 247, 248).

Groundwater in the area of the landfill flows in a southwest direction (Ref. No. 5, pp. 5-8). Therefore, background for groundwater samples was determined to be MW-1. Contaminants detected in the background monitoring well include: cadmium (21 micrograms per liter [ug/L]), iron (22,683 ug/L), lead (104 ug/L), manganese (79 ug/L), and zinc (136 ug/L).

Calcium was detected at more than three times background in MW-2 (10,800 ug/L). Sodium was detected at more than three times background in MW-3 (7,480 ug/L) (Ref. No. 1, pp. 253-257, 262-271).

Soil samples taken during the March 14, 1989 Site Inspection indicated the presence of several PAH compounds by the soil erosion pipes, on the western portion of the landfill including: fluoranthene (1,300 micrograms per kilogram [ug/kg]); pyrene (1,200 ug/kg); chrysene (990 ug/kg); benzo(b)fluoranthene (1,200 ug/kg); and benzo(a)pyrene (900 ug/kg) (Ref. No. 1, pp. 253-257, 262-271, 288-359). All samples were analyzed using EPA methods.

SITE INSPECTION PRIORITIZATION SAMPLING RESULTS

Based on a review of available background information, data generated during the NUS Corporation Site Investigation, and data and target information applicable to evaluating the site under the Hazard Ranking System (HRS), it was determined that further sampling was not necessary to characterize the site.

PART IV: HAZARD ASSESSMENT

GROUNDWATER ROUTE

- 1. Describe the likelihood of a release of contaminant(s) to the groundwater as follows: observed release, suspected release, or none. Identify contaminants detected or suspected and provide a rationale for attributing them to the site. For observed release, define the supporting analytical evidence and relationship to background.**

A release of contaminants to groundwater is not observed or suspected. Calcium was detected in MW-2 (10,800 ug/L) more than three times background monitoring well MW-1. Sodium was detected at more than three times background in MW-3 (7,480 ug/L). Levels of iron more than three times background were detected in MW-3 (48,200 parts per billion [ppb]) and MW-4 (42,400 ppb) in the January 1986 sampling event; and were also detected in MW-2 (1,290 ppb), MW-3 (750 ppb), and MW-4 (320 ppb) in the January 1988 sampling event. Although these contaminants were detected at more than three times background, these contaminants are commonly found in municipal landfills, and are not believed to have been attributable to hazardous waste deposition.

Ref. Nos. 1, pp. 253-257, 262-271; 5, pp. 5-8; 13, p. 1

- 2. Describe the aquifer of concern; include information such as depth, thickness, geologic composition, areas of karst terrain, permeability, overlying strata, confining layers, interconnections, discontinuities, depth to water table, groundwater flow direction.**

The aquifer of concern for the Newfield Landfill site consists of the Cohansey Sand and the underlying Kirkwood formation. Both formations are part of the New Jersey Coastal Plain Aquifer system, which has been a designated sole source aquifer.

The Cohansey Sand is composed of fine to course-grained quartzose sand, with lenses of clay and gravel. The thickness of the formation in the Newfield area is approximately 130 feet. The formation is overlain by a thin layer of Pleistocene-age sand and gravel known as the Bridgeton Formation. The thickness of the Bridgeton Formation in the vicinity of the site is unknown; however the formation ranges up to 50 feet thick in Gloucester County. The formation is hydraulically connected to the Cohansey Sand.

The Cohansey Sand is underlain by, and hydraulically connected to, the Kirkwood Formation. The Kirkwood formation is composed of clay, silt, and very fine to coarse-grained sand. The formation is encountered at an estimated depth of 135 feet, and is approximately 90 feet thick in the vicinity of the site. Although the Cohansey Sand and the Kirkwood Formation are separate geologic formations, they are regarded as a single hydrogeologic unit referred to as the Cohansey-Kirkwood Aquifer. The permeability of the Cohansey Sand and the Kirkwood Formation ranges from 10^{-3} to 10^{-5} cm/sec. The water table generally follows the topography and is encountered at a depth of approximately 13 feet. The direction of groundwater flow is southwest.

The Kirkwood Formation is underlain by a series of confining beds and aquifers. The sequence of formations below the Kirkwood Formation in descending order is as follows: a composite confining bed, the Wenonah-Mount Laurel Aquifer, the Marshalltown-Wenonah confining bed, the Englishtown Aquifer System, the Merchantville-Woodbury confining bed, and the Potomac-Raritan-Magothy Aquifer System. The Potomac-Raritan-Magothy Aquifer System rests on the Wissahicken Formation which forms the bedrock for the area. Bedrock is encountered at a depth of approximately 3,000 feet.

Ref. No. 1, pp. 152-165

- 3. What is the depth from the lowest point of waste disposal/storage to the highest seasonal level of the saturated zone of the aquifer of concern?**

The lowest point of waste disposal/storage is 12 feet below ground surface. The highest seasonal level of the saturated zone of the aquifer of concern is 135 feet. Therefore, the depth from the lowest point of waste disposal storage to the highest seasonal level of the aquifer of concern is approximately 123 feet.

Ref. No. 1, pp. 2, 6, 152-165

- 4. What is the permeability value of the least permeable continuous intervening stratum between the ground surface and the top of the aquifer of concern?**

The permeability of the Cohansey Sand and the Kirkwood Formation has been estimated to be 10^{-4} cm/sec.

Ref. No. 17, p. 3

- 5. What is the net precipitation at the site (inches)?**

The net precipitation at the site is between 15 and 30 inches.

Ref. No. 17, p. 2

- 6. What is the distance to and depth of the nearest well that is currently used for drinking purposes?**

Frost Associates data indicates that seven people drink from private wells located within 0-0.25 mile of the site. The reference does not provide exact locations for these wells. Therefore, the nearest well currently used for drinking is assumed to be 0.25 mile from the site. USGS well data shows that all wells within 4 miles of the Newfield Landfill site are screened in the Cohansey-Kirkwood Aquifer.

Ref. Nos. 4, pp. 1-11; 14, pp. 9-13

June 13, 1997

7. **If a release to groundwater is observed or suspected, determine the number of people that obtain drinking water from wells that are documented or suspected to be actually contaminated by hazardous substance(s) attributed to an observed release from the site.**

No release of contaminants attributable to the Newfield Landfill groundwater is observed or suspected.

8. **Identify the population served by wells located within 4 miles of the site that draw from the aquifer of concern.**

DistancePopulationCohansey-Kirkwood Formation

0 - ¼ mile	7
>¼ - ½ mile	875
>½ - 1 mile	1,350
>1 - 2 miles	5,291
>2 - 3 miles	8,244
>3 - 4 miles	12,047

All residents of Pittsgrove and Franklin Townships use private wells as their potable water supply. This includes private well usage within one mile of the Newfield Landfill site.

Ref. No. 4, pp. 1-11

State whether groundwater is blended with surface water, groundwater, or both before distribution.

The Borough of Newfield has two municipal wells within the 4-mile radius of the site, which are blended prior to distribution. Vineland has 14 municipal wells which are blended prior to distribution. Six of these wells are within the 4-mile radius of the site.

Ref. No. 14, pp. 1-13

Is a designated wellhead protection area within 4 miles of the site?

Wellhead protection areas have not been delineated in New Jersey.

Ref. No. 19, p. 1

Does a waste source overlie a designated or proposed wellhead protection area? If a release to groundwater is observed or suspected, does a designated or proposed wellhead protection area lie within the contaminant boundary of the release?

Not applicable.

9. **Identify one of the following resource uses of groundwater within 4 miles of the site (i.e., commercial livestock watering, ingredient in commercial food preparation, supply for commercial aquaculture, supply for major, or designated water recreation area, excluding drinking water use, irrigation (5-acre minimum) of commercial food or commercial forage crops, unusable).**

Groundwater within 4 miles of the site is used for drinking and agricultural purposes.

Ref. No. 1, p. 7

SURFACE WATER ROUTE

- 10. Describe the likelihood of a release of contaminant(s) to surface water as follows: observed release, suspected release, or none. Identify contaminants detected or suspected and provide a rationale for attributing them to the site. For observed release, define the supporting analytical evidence and relationship to background.**

There is no observed or suspected release of contaminants to surface water. No surface water or sediment samples were collected from surface water bodies near the site. The nearest surface water is located approximately 0.04 mile southwest of the site; however, there is no direct connection between surface runoff and a stream or river. The surface water originates on the neighboring Shieldalloy property.

Ref. Nos. 1, pp. 7, 8, 56; 16, p. 1

- 11. Identify the nearest down slope surface water. If possible, include a description of possible surface drainage patterns from the site.**

The nearest downslope surface water is Hudson Brook, located approximately 0.04 mile southwest of the site. The site is generally level, with a very gentle slope, less than one percent, to the southwest. The headwaters of the Hudson Brook are the probable point of entry (PPE) to surface water and beginning of the in-water segment of the 15-mile surface water pathway. From the PPE, Hudson Brook flows west for approximately 1.56 miles to Burnt Mill Branch Lake, the lake spans 0.4 mile and the Burnt Mill Branch flows west from the lake for 1.7 miles to the Maurice River, where the in-water segment turns south and flows for 7.6 miles to Union Lake. Union Lake spans 2.5 miles and the Maurice River exits the lake flowing south. The in water segment ends approximately 1.2 miles downstream.

Ref. Nos. 1, pp. 7, 8, 56; 16, p. 1

- 12. What is the distance in feet to the nearest downslope surface water? Measure the distance along a course that runoff can be expected to follow.**

The nearest downslope surface water is Hudson Brook, located approximately 211 feet southwest of the site.

Ref. No. 16, p. 1

13. Identify all surface water body types within 15 downstream miles.

<u>Name</u>	<u>Water Body Type</u>	<u>Flow (cfs)</u>	<u>Saline/Fresh/Brackish</u>
Hudson Brook	Minimal Stream	10	Fresh
Burnt Mill Branch Lake	Minimal Stream	10	Fresh
Burnt Mill Branch	Minimal Stream	10	Fresh
Maurice River	Mod/Large Stream	149	Fresh
Union Lake	Mod/Large Stream	149	Fresh
Maurice River	Mod/Large Stream	149	Fresh

Ref. Nos. 1, p. 399; 16, p. 1; 17, p. 4; 20, pp. 1-15

14. Determine the 2 yr, 24 hr rainfall (inches) for the site.

The 2-year, 24 hour rainfall in the area of the site is approximately 3 inches.

Ref. No. 18, pp. 1, 2

15. Determine size of the drainage area (acres) for sources at the site.

The drainage area for sources at the site is 28.86 acres.

Ref. No. 1, p. 2

16. Describe the predominant soil group in the drainage area.

The predominant soil group in the drainage area consists of a loamy sand (Group A).

Ref. No. 1, pp. 8, 152-165

17. Determine the type of floodplain that the site is located within.

The site is located in an area of minimal flooding (i.e. outside the 500-year flood boundary).

Ref. No. 1, pp. 237-240

18. Identify drinking water intakes in surface waters within 15 miles downstream of the point of surface water entry. For each intake identify: the name of the surface water body in which the intake is located, the distance in miles from the point of surface water entry, population served, and stream flow at the intake location.

June 13, 1997

<u>Intake</u>	<u>Distance</u>	<u>Population Served</u>	<u>Flow (cfs)</u>
None	N/A	N/A	N/A

Ref. No. 20, pp. 1-15

19. Identify fisheries that exist within 15 miles downstream of the point of surface water entry. For each fishery specify the following information:

<u>Fishery Name</u>	<u>Water Body Type</u>	<u>Flow (cfs)</u>	<u>Saline/Fresh/Brackish</u>
Hudson Brook	Minimal Stream	10	Fresh
Burnt Mill Branch Lake	Minimal Stream	10	Fresh
Burnt Mill Branch	Minimal Stream	10	Fresh
Maurice River	Mod/Large Stream	149	Fresh
Union Lake	Mod/Large Stream	149	Fresh
Maurice River	Mod/Large Stream	149	Fresh

Ref. Nos. 1, p. 399; 16, p. 1; 17, p. 4; 20, pp. 1-15

20. Identify surface water sensitive environments that exist within 15 miles of the point of surface water entry.

<u>Environment</u>	<u>Water Body Type</u>	<u>Flow (cfs)</u>	<u>Wetland Frontage</u>
Hudson Brook Wetlands	Minimal Stream	10	2
Burnt Mill Branch Wetlands	Minimal Stream	10	1.2
Burnt Mill Branch Wetlands	Minimal Stream	10	3.2
Maurice River Wetlands	Mod/Large Stream	149	15.2
Union Lake Wetlands	Mod/Large Stream	149	4.1
Maurice River Wetlands	Mod/Large Stream	149	0.7
Natural Heritage Priority Site	Mod/Large Stream	149	5.2

Federal Designated Endangered or Threatened Species

Haliaeetus Leucocephalus, Bald Eagle

Helonias Bullata, Swamp-Pink

State Designated Endangered or Threatened Species

Buteo Lineatus, Red-Shouldered Hawk

Crotalus Horridus Horridus, Timber Rattlesnake

Haliaeetus Leucocephalus, Bald Eagle

Pituophis Melanoleucus Melanoleucus, Northern Pine Snake

Strix Varia, Barred Owl

Eleocharis Tortilis, Twisted Spikerush

Eupatorium Resinosum, Pine Barren Boneset

State Designated Endangered or Threatened Species (Continued)

Helonias Bullata, Swamp-Pink

Juncus Caesariensis, New Jersey Rush

Regional (Pinelands Commission) Designated Endangered or Threatened Species

Desmodium Strictum, Pineland Tick-Trefoil

Eupatorium Resinosum, Pine Barren Boneset

Helonias Bullata, Swamp-Pink

Juncus Caesariensis, New Jersey Rush

Scizaea Pusilla, Curly Grass Fern

Other State Designated Endangered or Threatened Species

Arethusa Bulbosa, Dragon Mouth

Eriocaulon Parkeri, Parker's Pipewort

Polygala Polygama, Racemed Milkwort

Ref. Nos. 1, p. 399; 11, pp. 1, 5-18; 16, p. 1; 17, p. 4

21. If a release to surface water is observed or suspected, identify any intakes, fisheries, and sensitive environments from question Nos. 18-20 that are or may be actually contaminated by hazardous substance(s) attributed to an observed release of from the site.

Intake: N/A

Fishery: N/A

Sensitive Environment: N/A

22. Identify whether the surface water is used for any of the following purposes, such as: irrigation (5 acre minimum) of commercial food or commercial forage crops, watering of commercial livestock, commercial food preparation, recreation, potential drinking water supply.

There are no known uses of surface water within 15 miles downstream for irrigation of commercial food (i.e., agriculture).

Ref. No. 1, pp. 7,8

SOIL EXPOSURE PATHWAY

- 23. Determine the number of people that occupy residences or attend school or day care on or within 200 feet of observed contamination.**

Residences are located adjacent to the northern border of the site; a commercial business is located directly south of the site; and Shieldalloy, an industrial property is located adjacent to the southwest of the site. However, all properties surrounding the site are located greater than 200 feet from areas of observed contamination on site. There are no schools or day care centers within 200 feet of the site.

Ref. No. 10, pp. 1-5

- 24. Determine the number of people that regularly work on or within 200 feet of observed contamination.**

The site is currently inactive, therefore there are no workers within 200 feet of observed contamination.

Ref. No. 10, pp. 1-5

- 25. Identify terrestrial sensitive environments on or within 200 feet of observed contamination.**

There are no terrestrial sensitive environments within 200 feet of observed contamination.

Ref. Nos. 10, pp. 1-5; 11, pp. 15-18

- 26. Identify whether there are any of the following resource uses, such as commercial agriculture, silviculture, livestock production or grazing within an area of observed or suspected soil contamination.**

Soil is not used as a resource within an area of observed or suspected soil contamination.

Ref. No. 10, pp. 1-5

AIR PATHWAY

27. Describe the likelihood of release of hazardous substances to air as follows: observed release, suspected release, or none. Identify contaminants detected or suspected and provide a rationale for attributing them the site. For observed release, define the supporting analytical evidence and relationship to background.

A release of contaminants to the air is not observed or suspected. There are no known analytical data available to determine if a release from the site to the air has occurred. No readings above background were detected in the breathing zone on the Hnu photoionization detector during the on-site reconnaissance conducted by Region II START on 18 February 1997.

Ref. Nos. 1, p. 8; 10, pp. 1-5

28. Determine populations that reside within 4 miles of the site.

<u>Distance</u>	<u>Population</u>
On site	0
>0 - ¼ mi	127
>¼ - ½ mi	403
>½ - 1 mi	1,636
>1 - 2 mi	5,613
>2 - 3 mi	7,038
>3 - 4 mi	17,563

Ref. No. 4, pp. 1-11

29. Identify sensitive environments, including wetlands and associated wetlands acreage, within 4 miles of the site.

<u>Distance</u>	<u>Wetlands Acreage</u>
0 - ¼ mi	1.5
>¼ - ½ mi	3.5
>½ - 1 mi	17
>1 - 2 mi	477
>2 - 3 mi	853
>3 - 4 mi	989

Sensitive Environments Within 4-miles of Newfield Landfill

State Designated Endangered or Threatened Species

Accipiter Cooperii, Cooper's Hawk
Hyla Andersonii, Pine Barrons Treefrog
Pituophis Melanoleucus Melanoleucus, Northern Pine Snake
Protonotaria Citrea, Prothonotary Warbler
Strix Varia, Barred Owl
Eleocharis Melanocarpa, Black Fruited Spikerush
Eupatorium Resinosum, Pine Barren Boneset
Onosmodium Virginianum, Virginia False-Gromwell
Prunus Angustifolia, Chicksaw Plum

Regional (Pinelands Commission) Designated Endangered or Threatened Species

Asclepias Rubra, Red Milkweed
Coreopsis Rosea, Pink Tickseed
Desmodium Strictum, Pineland Tick-Trefoil
Muhlenbergia Torreyana, Pine Barren Smoke Grass
Nymphoides Cordata, Floating Heart
Rhynchospora Inundata, Horned Beaked Rush

Other State Designated Endangered or Threatened Species

Notropis Chalybaeus, Ironcolor Shiner
Enallagma Pictum, Scarlet Bluet
Epitheca Spinosa, Robust Baskettail
Gomphus Apomyius, Banner Clubtail
Cuscuta Coryli, Hazel Dodder
Paspalum Dissectum, Mudbank Paspalum
Polygala Polygama, Racemed Milkwort
Stachys Hyssopifolia, Hyssop Hedge-Nettle

Ref. Nos. 11, pp. 2, 5-18; 16, p. 1

30. **If a release to air is observed or suspected, determine the number of people that reside or are suspected to reside within the area of air contamination from the release.**

A release to air is not observed or suspected; see question no. 27 for a description of likelihood of a release.

31. **If a release to air is observed or suspected, identify any sensitive environments, listed in question No. 29, that are or may be located within the area of air contamination from the release.**

A release to air is not observed or suspected; see question no. 27 for a description of likelihood of a release.

REFERENCE NO. 1

FINAL DRAFT
SITE INSPECTION REPORT
NEWFIELD LANDFILL
NEWFIELD, NEW JERSEY

PREPARED UNDER
TECHNICAL DIRECTIVE DOCUMENT NO. 02-8810-46
CONTRACT NO. 68-01-7346

FOR THE

ENVIRONMENTAL SERVICES DIVISION
U.S. ENVIRONMENTAL PROTECTION AGENCY

SEPTEMBER 15, 1989

NUS CORPORATION
SUPERFUND DIVISION

SUBMITTED BY:



DIANE TRUBE
PROJECT MANAGER



PAUL BAUER
SITE MANAGER

REVIEWED/APPROVED BY:



RONALD M. NAMAN
FACILITY OFFICE MANAGER

SITE NAME:	Newfield Landfill	EPA ID NO.:	NJD980505556
ADDRESS:	Catawba Avenue and Weymouth Road Newfield, New Jersey	LATITUDE:	39° 32' 30" N
		LONGITUDE:	75° 00' 48" W
		BLOCK AND LOT NO.:	Block 7, Lot 2D Block 25, Lots 17, 18, 19, 19A, and part of 20 Block 26, Lots 8A and 9
		ACREAGE:	28.86

1.0 SITE SUMMARY

The Newfield Landfill (aka Gorgo Lane Landfill) is located in the southeast corner of the Borough of Newfield, Gloucester County, New Jersey. The landfill is located in a sparsely populated residential and commercial area. The terrain at the site and in the surrounding area is generally level.

The 28.86-acre landfill consists of two sections, the original site (19 acres) and the extension (9.86 acres). The extension lies adjacent to the western boundary of the original site. The original portion of the site was purchased from Mr. Gorgo by the Borough of Newfield in 1972. At the time the property was purchased it contained a gravel pit approximately 10 to 12 feet deep of unknown areal dimensions. Apparently the borough did register the landfill with the New Jersey Department of Environmental Protection (DEP); however, no information is available regarding the registration. The land for the extension was apparently leased by the borough some time between 1972 and 1978. In August 1979 the borough received approval from the DEP to use the extension. In December 1979 the borough closed the landfill after deciding it was becoming too expensive to operate. However, the borough continued to deposit leaves and wood on the site. The borough also allowed local contractors to dump waste concrete in the landfill. In May 1982 the DEP granted permission for the borough to continue depositing concrete, leaves, and brush in the landfill to bring the site up to grade so that the site could be properly closed. In October 1984 the borough was issued an interim New Jersey Pollution Discharge Elimination System (NJPDES) permit No. NJ0054399 to install monitoring wells and conduct quarterly sampling of groundwater. The borough failed to begin testing within the required time and was issued a Notice of Violation in May 1985 for failure to comply with permit requirements. In October 1985 the borough received a letter from the Gloucester County Department of Health stating that the landfill was no longer a registered facility and dumping at the site must stop. The borough stopped testing groundwater at the site in April 1988, after allowing the NJPDES permit to expire. In May 1988 the borough's engineers asked the DEP for relief from quarterly testing on the basis that no groundwater contamination attributable to the landfill had been detected in the previous four years of testing. In February 1989 the Newfield Borough Council President again asked for relief from testing. It is not known if relief was granted or if testing has been resumed.

Wastes deposited at the site consist of household and commercial municipal waste, bulk waste such as concrete and wood, waste glass, and vegetative waste consisting of leaves and brush. In 1976 several hundred bushels of a white powdered substance was dumped on site. The substance was subsequently removed from the landfill and disposed of off site. A chemical analysis of the material indicated that the substance was a mixture of salts. Between 1972 and 1978 the landfill accepted a large quantity of waste glass from Owens-Illinois Inc. There is no evidence of any hazardous wastes having been deposited in the landfill.

A review of the quarterly analyses conducted on groundwater samples collected at the landfill indicate that permit limits for several metals have occasionally been exceeded; however, there seems to be no pattern to the occurrences in either time or location and therefore they do not appear to be indicative of a contaminant plume in the groundwater. The environmental media of greatest concern are the underlying soils and groundwater. The landfill has no liner and no leachate collection system. Any leachate that might be produced by the landfill could easily migrate to groundwater.

There is a high potential for direct contact with the site. The site is not fenced or guarded. There are 10 to 15 residences within 0.25 mile of the site and refuse at the landfill is exposed or inadequately covered. Inspections conducted by the DEP and the Gloucester County Department of Health indicate that the borough has consistently failed to adequately cover refuse deposited at the site. An inspection conducted by the EPA on December 10, 1979 found evidence of wooden pallets having been burned on the western portion of the landfill.

NUS Corporation Region 2 FIT personnel performed a site inspection of the Newfield Landfill on March 14, 1989. During the inspection four groundwater samples and four soil samples were collected. Analyses of the groundwater samples indicated that no release of contaminants attributable to the site has occurred. Analyses of soil samples indicated the presence of several polycyclic aromatic hydrocarbon (PAH) compounds. Since there is no containment of the landfill these contaminants are accessible to migration routes.

Ref. Nos. 1-15, 32, 33

2.0 SITE INSPECTION NARRATIVE

2.1 EXISTING ANALYTICAL DATA

Since 1979 the Borough of Newfield has been required to conduct quarterly sampling of monitoring wells on the Newfield Landfill. A summary of substances detected outside of permit limits for three sampling events conducted in January 1986, 1987, and 1988 is presented in Table 1. The samples were collected and analyzed by Quality Control Labs Inc., a New Jersey certified laboratory. The location of the monitoring wells is indicated on Figure 2, Section 3.0.

TABLE 1 - A Summary of Substances Exceeding Permit Limits for Sampling Events in January 1986, 1987 and 1988

		WELLS				
		Upgradient MW-1	Downgradient MW-2	Downgradient MW-3	Downgradient MW-4	Permit Limit
<hr/>						
<u>January 1986</u>						
	Chromium		51			50
	Iron	11,600	31,400	48,200	42,400	300
	Lead	254	410	274	235	50
<u>January 1987</u>						
	Iron	22,500	17,500	5,000	13,800	300
	Lead	350	280	270	200	50
	Manganese	210	100		60	50
	Mercury				3	2
	Silver				350	50
<u>January 1988</u>						
	Iron	100	1,290	750	320	300
	Fluoride	2,700				2,000
	Manganese		110			50

Notes: All data are reported in parts per billion.

A blank space indicates that data did not exceed permit limits.

2.2 WASTE SOURCE DESCRIPTION

The Newfield Landfill has apparently been in operation since the borough acquired it in 1972. The landfill was permitted to accept municipal waste (household and commercial), bulky waste (except appliances, whole trees, automobiles, and large vehicle parts and tires), vegetative waste (limited to leaves and trees processed through a wood chipper) and waste glass. In December 1979 the borough decided to close the landfill. In 1982 the borough received permission from the DEP to continue depositing concrete, leaves, and brush to bring the landfill up to grade. During a site reconnaissance conducted by NUS Corporation Region 2 FIT personnel on February 23, 1989 a single empty drum was found resting on the covered and graded portion of the landfill. Evidently, the drum is the result of illegal dumping since previous inspections conducted by the DEP found no evidence of drums on site. Two soil samples were collected by the NUS personnel at the drum site. Analyses of the samples did not indicate the presence of any hazardous contaminants.

The landfill consists of two sections. The original portion covers 19 acres and an extension covers 9.86 acres. The extension, which was leased by the borough some time between 1972 and 1978, lies adjacent to the western boundary of the original portion. Wastes have been deposited on approximately 6.5 acres of the original portion and 2.2 acres of the extension. When the borough acquired the original portion of the landfill it was a gravel pit approximately 10 to 12 feet deep. The areal dimensions of the pit are unknown. The landfill is located in the southeast corner of the Borough of Newfield, adjacent to the northern side of the old Pennsylvania-Reading Railroad Line. Gorgo Lane runs through the center of the landfill. The landfill has no liner or leachate collection system and has not been capped with any impermeable material. The eastern portion of the landfill has been covered with soil and graded. In 1976 several hundred bushels of a white powdered substance were dumped on the site. The material was removed and disposed of off site. A chemical analysis of the material conducted by the DEP indicated that the substance was a mixture of salts. The landfill received a large quantity of waste glass from Owens-Illinois Inc. from 1972 to 1978. There is no evidence of any hazardous wastes having been deposited in the landfill.

Ref. Nos. 1, 6, 7, 10, 20, 24, 32

2.3 GROUNDWATER ROUTE

There has been no documented release of contaminants to groundwater. The aquifer of concern consists of the Cohansey Sand and the underlying Kirkwood Formation. Both formations are part of the New Jersey Coastal Plain Aquifer System, which has been designated as a sole source aquifer.

The Cohansey Sand is composed of fine to coarse-grained quartzose sand, with lenses of clay and gravel. The thickness of the formation in the Newfield area is approximately 130 feet. The formation is overlain by a thin layer of Pleistocene-age sand and gravel known as the Bridgeton Formation. The thickness of the Bridgeton Formation in the vicinity of the site is unknown; however, the formation ranges up to 50 feet thick in Gloucester County. The formation is hydraulically connected to the Cohansey Sand. The Cohansey Sand is underlain by, and hydraulically connected to, the Kirkwood Formation. The Kirkwood Formation is composed of clay, silt, and very fine to coarse-grained sand. The formation is encountered at an estimated depth of 135 feet and is approximately 90 feet thick in the vicinity of the site. Although the Cohansey Sand and the Kirkwood Formation are separate geologic formations, they are regarded as a single hydrologic unit referred to as the Cohansey-Kirkwood Aquifer. The permeability of the Cohansey Sand and the Kirkwood Formation ranges from 10^{-3} to 10^{-5} cm/sec. The water table generally follows the topography and is encountered at a depth of approximately 13 feet. The direction of groundwater flow is southwest. The net annual precipitation is 9 inches.

The Kirkwood Formation is underlain by a series of confining beds and aquifers. The sequence of formations below the Kirkwood Formation in descending order is as follows: a composite confining bed, the Wenonah-Mount Laurel Aquifer, the Marshalltown-Wenonah confining bed, the Englishtown Aquifer system, the Merchantville-Woodbury confining bed, and the Potomac-Raritan-Magothy Aquifer system. The Potomac-Raritan-Magothy Aquifer system rests on the Wissahicken Formation which forms the bedrock for the area. Bedrock is encountered at a depth of approximately 3,000 feet.

The site is adjacent to the Shield Alloy plant, which operated waste lagoons that contaminated the groundwater with chromium. As a result, all private wells within 0.25 mile of Shield Alloy were closed and all residences in Newfield are on now public water supply. The Newfield Water Department operates three wells located in the Town of Newfield. Well NWD-1 is located at the corner of Catawba Avenue and Church Street, approximately 2,100 feet northwest of the site. Well NWD-3 is located at the corner of Catawba Avenue and Hazel Avenue, approximately 1,800 feet northwest of the site. Well NWD-5 is located at the corner of Catawba Avenue and Woodlawn Avenue, approximately 1,900 feet northeast of the site. Well NWD-5 is upgradient of the landfill. The depth of wells NWD-1 and NWD-3 are 136 feet and 162 feet respectively. The depth of well NWD-5 is unknown. All wells draw water from the Cohansey-Kirkwood Aquifer. The Newfield Water Department serves approximately 1,500 people.

The City of Vineland is located approximately 3 miles south of the landfill. The nearest well used for the public supply of Vineland is well VWSU-10, located at the corner of Route 47 and Arbor Avenue, approximately 1.7 miles southwest of the site. The well is 175 feet deep. The Vineland Water Department serves approximately 30,000 people. Groundwater is the sole source of drinking water for both Newfield and Vineland; no alternate water supply is available.

Outside the Borough of Newfield in the surrounding Franklin Township there are numerous private wells used for drinking and irrigation of food crops within 3 miles of the site. The exact locations of these wells are unknown.

There is a potential for a release of contaminants to groundwater. The landfill has no liner or leachate collection system. The shallow water table, 13 feet below ground surface, and the porous soil increase the probability that any hazardous wastes deposited in the landfill would migrate to groundwater. The landfill is situated over a sole source aquifer that serves approximately 66,800 people within a three mile radius.

Ref. Nos. 7, 16, 17, 18, 19, 20, 22, 23, 27, 28, 29, 33

2.4 SURFACE WATER ROUTE

No release of contaminants to surface water has been documented. The site is generally level, with a very gentle slope, less than 1 percent, to the southwest. During two visits to the site by NUS Corporation Region 2 FIT personnel, ponded water was observed on the property. The elevation of the site ranges from 102 feet to 108 feet above sea level. Drainage from the site travels southwest to Hudson Brook. Hudson Brook originates on the Shield Alloy property, which is adjacent to the southern boundary of the landfill. The distance from the landfill to Hudson Brook is estimated to be several hundred feet. The slope of the intervening terrain is estimated to be less than 1 percent. Hudson Brook travels approximately 1.7 miles before discharging into a small unnamed lake. The lake covers approximately 16 acres. The lake discharges into Burnt Mill Branch. Burnt Mill Branch travels approximately 1.6 miles, passing through a freshwater wetland area, then discharges into the Maurice River. The unnamed wetland area surrounding Burnt Mill Branch covers approximately 40 acres and is located approximately 2.1 miles downstream from the site. There are no uses of surface water within 3 miles of the site other than recreation. There are no critical habitats of federally listed endangered species within 2 miles downstream of the site. The landfill is not on a floodplain. The 1-year 24-hour rainfall for the area is 2.75 inches.

There is a small potential for a release of contaminants to surface water. There is no containment system for the landfill. Any leachate that might be generated at the site could migrate to surface water. However, since the slope of the facility and the intervening terrain is less than 1 percent, any leachate produced would more likely percolate into the sandy soils rather than travel overland to Hudson Brook. There is no sensitive environment within 2 miles of the site that could potentially be affected by surface water contamination.

Ref. Nos. 20, 22, 23, 25, 26, 29, 32, 33

2.5 AIR ROUTE

No readings above background were detected in the ambient air on the OVA or HNu during the on-site inspection conducted on March 14, 1989. Readings above background were detected on the radiation mini alert near the Shield Alloy fence along the southern boundary of the landfill. Radiation signs are posted on the fence near the slag piles which are located on the Shield Alloy property. The readings were between 0.3 and 1.0 millirem per hour.

There are no historic landmarks within view of the site.

Ref. No. 24

2.6 ACTUAL HAZARDOUS CONDITIONS

During a site inspection by NUS Corp. Region 2 FIT personnel, a potential for direct contact was observed. The site did not have any fences or guards which would prevent trespassing or illegal disposal at the site, and wastes deposited on the site have not been completely covered by fill material. Low levels of radiation, less than 1 millirem per hour, were detected on site along the fence on the southern boundary of the landfill. The source of the radiation is located on the Shield Alloy property, which is adjacent to the southern boundary of the landfill.

No other actual hazardous conditions pertaining to human or environmental contamination have been documented. Specifically:

- Contamination has not been documented either in organisms in a food chain leading to humans or in organisms directly consumed by humans.

- There have been no documented observed incidents of direct physical contact with hazardous substances at the facility involving a human being (not including occupational exposure) or a domestic animal. However, the potential for direct contact does exist because the site is accessible.
- There have been no documented incidents of damage to flora (e.g., stressed vegetation) or to fauna (e.g., fish kill) that can be attributed to the hazardous material at the facility.
- There is no documented contamination of a sewer or storm drain.
- It is not known if the facility presents significant fire or explosive threat to the public.
- There is no direct evidence of a release of contaminants from the facility to groundwater.

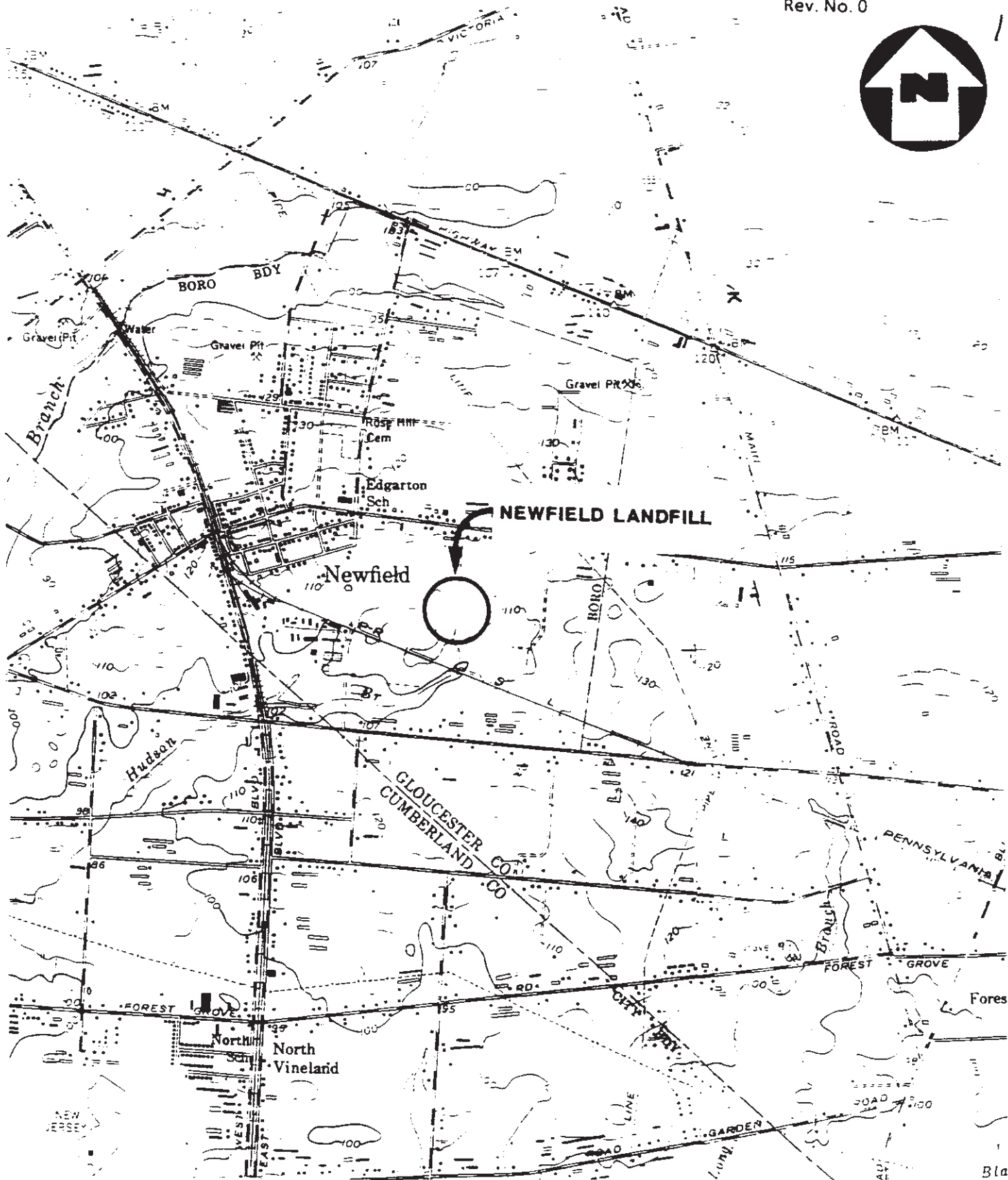
Ref. Nos. 24, 29

3.0 MAPS AND PHOTOS

Newfield Landfill Newfield, New Jersey

Contents

Figure 1:	Site Location Map
Figure 2:	Sample Location Map
Exhibit A-1:	Photograph Log-Site Reconnaissance
Exhibit A-2:	Photograph Log-Site Inspection



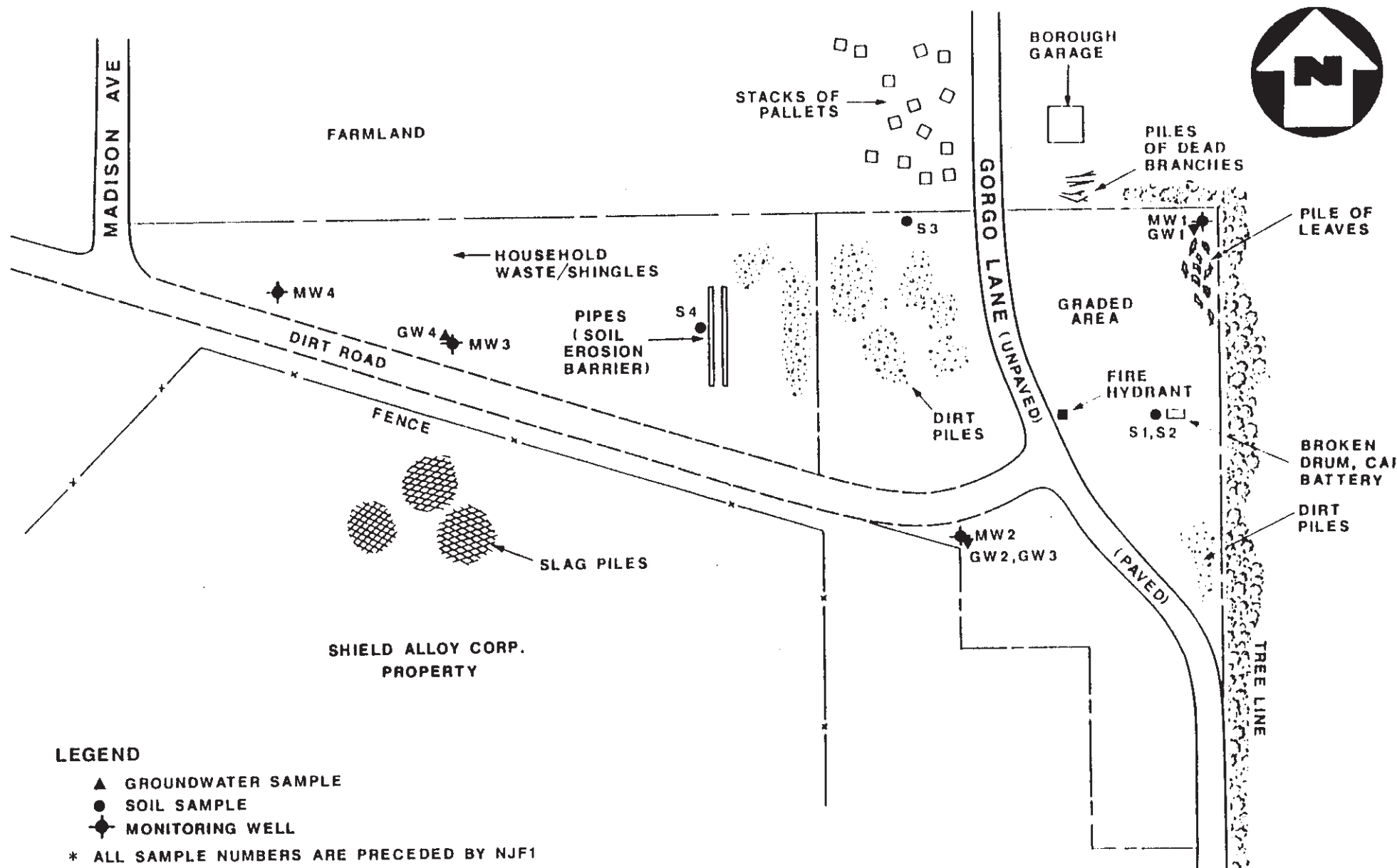
(QUAD) NEWFIELD, N.J.

SITE LOCATION MAP
NEWFIELD LANDFILL, NEWFIELD, N.J.

SCALE: 1" = 2000'

FIGURE 1





SAMPLE LOCATION MAP
NEWFIELD LANDFILL, NEWFIELD, N.J.

NOT TO SCALE

FIGURE 2

NUS
 CORPORATION

10

EXHIBIT A-1

PHOTOGRAPH LOG

NEWFIELD LANDFILL
NEWFIELD, NEW JERSEY

SITE RECONNAISSANCE: FEBRUARY 23, 1989

APPENDIX B

STREET OPENING PERMITS

**CITY VINELAND
ENGINEERING DEPARTMENT
APPLICATION AND PERMIT FOR RIGHT-OF-WAY OPENING**

Applicant Name: TRC Environmental Corporation
 Applicant Address: 21 Griffin Road North, Windsor, CT 06095
 Applicant Phone Number: 860-298-6225
 Street to be Opened: See attached table
 BLOCK NO. See attached table LOT NO. See attached table
 Purpose: Drilling for ground water sampling
 Anticipated Start Date: October 12, 2009 Estimated time for Completion: 2 weeks
 Name of Contractor: Uni-Tech Drilling
 Width of Opening (Ft.): 1 X Length of Opening (Ft.): 1 = Area (Sq. Ft.): 1 x 1 = 1
 Area (Sq. Ft.): 6 Divided by 9 = Area (Sq. Ft.): 0.67
 Underground location Request No. See attached table

FEE SCHEDULE

	FEE	TOTAL
Administration Fee	\$25.00	\$25.00
1). Minimum right-of-way opening for 16 Sq. Ft. or less	\$50.00	\$50.00
a). Greater than 16 Sq. Ft. but less than or equal to 50 Sq. Ft.	\$100.00	
b). For every Sq. Ft. of opening greater than 50 Sq. Ft the fee shall be \$1.00 per Sq. Ft.	\$1.00	
2). Curb and or gutter installation		
a). 0-100' L.F.	\$50.00	
b). Over 100 L.F. fee is \$25.00 per 100' L.F.	\$25.00	
3). Buried Cable minimum fee for up to 1,500 L.F.	\$50.00	
Over 1,500 L.F. is \$10.00 per 1,000 L.F.		
	Total:	\$75.00

Maximum fee on any of the above is \$500.00 unless otherwise determined by the City Engineer.

Performance Bond required YES _____ NO X
 Performance Bond, \$90.00 per Sq. Yd. X _____ S.Y. = AMOUNT \$ _____
 Must be Bond, Certified Check or Cashier Check

A Maintenance Bond shall be posted prior to the release of the performance bond, and shall remain in effect for two years.
 Maintenance Bond = 10% of Performance Bond \$ _____
 Must be Bond, Certified Check or Cashier Check

As the applicant for this permit I accept all the terms and conditions of the City of Vineland Chapter Number 241.
 It is agreed that all restoration pertaining to this right-of-way opening shall be done by the applicant according to the standards set forth in this ordinance.

Sr. Project Hydrogeologist
 Title (type or print)

Larry Butcher
 Signature of Applicant

10-5-09
 Date

-----FOR CITY USE ONLY-----

[Signature]
 For City Engineer

APPROVED X

DENIED ☐

10-9-09
 Date

Date of Final Inspection: _____
 Inspector's Approval: _____

COMMENTS: _____

• WARNING •
 CALL BEFORE YOU DIG
 1-800-272-1000
 FOR UTILITY LOCATIONS

PERMIT NO. 12836

Sample Location Summary
Shieldalloy Metallurgical Corporation
Newfield, New Jersey
October 2009

[illegible]

COUNTY PERMIT NUMBER 09-165

Approval Date 9-30-09

APPLICATION AND PERMIT TO OPEN HIGHWAY IN THE COUNTY OF CUMBERLAND

Application hereby being made by the undersigned, permission is hereby given to the undersigned to make an opening ~~in~~ within the Cumberland County right-of-way approximately
10-feet off the road pavement along the northern side of West Weymouth

Road or Street at a location adjacent to Block 501, Lot 7

of not more than 1 square feet, for the purpose of installing a soil boring,
which may be completed as a monitoring well.

_____ according to plan filed with the application of this permit.

The applicant agrees to fully comply with all resolutions, ordinances, rules and regulations of the County of Cumberland for the opening of County highways and particularly with the resolution dated August 9th, 1951 duly passed and advertised according to law by the Board of Chosen Freeholders of the County of Cumberland, a copy of which resolution the undersigned acknowledges receipt thereof at the time of receiving this permit.

The applicant agrees that the issuance of this permit shall constitute a valid contract between the County of Cumberland and the applicant.

The applicant likewise agrees that he will indemnify and save harmless the County from any loss or damage which may result by reason of the opening on behalf of the applicant of any street, road or highway owned or under the control of the County.

APPLICANT: TRC Environmental Corporation

By John Moss / John Moss

COUNTY OF CUMBERLAND

By [Signature]
County Engineer or his authorized agent.

All rights of the applicant under this permit shall become void ninety (90) days from the date hereof unless extended by endorsement made hereon by the County Engineer or his authorized agent.

Deposit Received: \$

Excavation by mechanical machinery or method is not granted unless the Cumberland County Engineer causes his signature to appear immediately below.

X _____

Tunnelling under the pavement is not authorized unless the Cumberland County Engineer causes his signature to appear immediately below.

Note: Attached is the \$1.00 permit application fee.

COUNTY PERMIT NUMBER 10-105

Approval Date 9/21/10

APPLICATION AND PERMIT TO OPEN HIGHWAY IN THE COUNTY OF CUMBERLAND

Application hereby being made by the undersigned, permission is hereby given to the undersigned to make an opening in North side of Weymouth Road right-of-way
(see attached drawing)

Road or Street at 158 Weymouth Road, Vineland

of not more than 1 square feet, for the purpose of drilling soil boring and
the possible installation of permanent monitoring wells

according to plan filed with the application of this permit.

The applicant agrees to fully comply with all resolutions, ordinances, rules and regulations of the County of Cumberland for the opening of County highways and particularly with the resolution dated August 9th, 1951 duly passed and advertised according to law by the Board of Chosen Freeholders of the County of Cumberland, a copy of which resolution the undersigned acknowledges receipt thereof at the time of receiving this permit.

The applicant agrees that the issuance of this permit shall constitute a valid contract between the County of Cumberland and the applicant.

The applicant likewise agrees that he will indemnify and save harmless the County from any loss or damage which may result by reason of the opening on behalf of the applicant of any street, road or highway owned or under the control of the County.

APPLICANT: TRC Engineers, Inc / Jorge Gomez

By [Signature]

COUNTY OF CUMBERLAND

By [Signature]

County Engineer or his authorized agent.

All rights of the applicant under this permit shall become void ninety (90) days from the date hereof unless extended by endorsement made hereon by the County Engineer or his authorized agent.

Deposit Received: \$ 1

Excavation by mechanical machinery or method is not granted unless the Cumberland County Engineer causes his signature to appear immediately below.

Tunnelling under the pavement is not authorized unless the Cumberland County Engineer causes his signature to appear immediately below.

APPENDIX C

MONITORING WELL PERMITS

STATE OF NEW JERSEY
DEPARTMENT OF ENVIRONMENTAL PROTECTION
TRENTON, NJ

P200912475

Mail To:

NJDEP
BUREAU OF WATER SYSTEMS
AND WELL PERMITTING
PO BOX 426
TRENTON, NJ 08625-0426

MONITORING WELL PERMIT

Permit No. _____

VALID ONLY AFTER APPROVAL BY THE D.E.P.

COORD #: 35.

Owner City of Vineland
Address 640 E. Wood St
Vineland, NJ 08360
Name of Facility SAME
Address R.O.W. Strawberry Ave

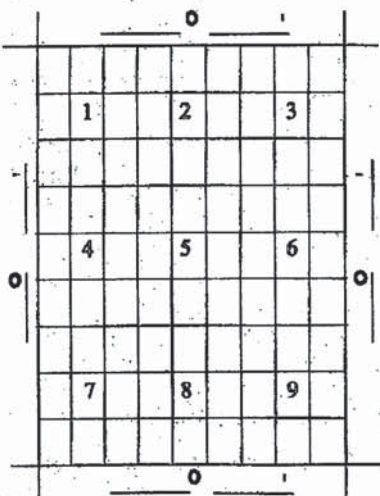
Driller Uni-Tech Drilling Co., Inc
Address P.O. Box 407
Franklinville, NJ 08322

Diameter of Well(s) <u>4</u> inches	Proposed Depth of Well(s) <u>4-200</u> Feet
# of Wells <u>1</u>	Will pumping equipment be utilized? YES <input type="checkbox"/> NO <input type="checkbox"/>
Applied for (max. 10) <u>1</u>	If Yes, give pump capacity _____ cumulative GPM
Type of Well (see reverse) <u>Monitoring</u>	

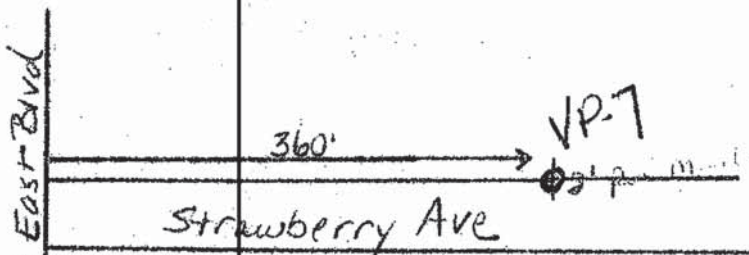
LOCATION OF WELL(S)

Lot # <u>ROW</u>	Block # <u>ROW</u>	Municipality <u>Vineland</u>	County <u>Cumb</u>
------------------	--------------------	------------------------------	--------------------

State Atlas Map No. _____



North East Blvd



Draw sketch of well(s) nearest roads, buildings, etc. with marked distances in feet. Each well MUST be labeled with a name and/or number on the sketch.

PROPOSED WELL LOCATION (NAD 83 HORIZONTAL DATUM)
NJ STATE PLANE COORDINATE IN US SURVEY FEET

NORTHING: 255287

EASTING: 345199

METHOD

- ☐ SURVEY
☒ DIGITAL IMAGE
☐ GPS

FOR MONITORING WELLS, RECOVERY WELLS, OR PIEZOMETERS, THE FOLLOWING MUST BE COMPLETED BY THE APPLICANT. PLEASE INDICATE WHY THE WELLS ARE BEING INSTALLED:

- ☐ RCRA Site
☐ Spill Site
☐ Underground Storage Tank Site
☐ ISRA Site
☐ Operational Ground Water Permit Site
☐ CERCLA (Superfund) Site
☐ Pretreatment and Residuals Site
☐ Water and Hazardous Waste Enforcement Case
☐ Water Supply Aquifer Test Observation Well
☐ Other (explain) _____

CASE I.D. Number _____

This Space for Approval Stamp

WELL PERMIT APPROVED
N.J. D.E.P.

OCT 14 2009

BUREAU OF WATER SYSTEMS
& WELL PERMITTING

FOR D.E.P. USE

☐ Issuance of this permit is subject to the conditions attached. (see next page)

☒ For monitoring purposes only

SEE REVERSE SIDE FOR IMPORTANT PROVISIONS PERTAINING TO THIS PERMIT.

In compliance with N.J.S.A. 58-4A-14, application is made for a permit to drill a well as described above.

Date 10/5/09

Signature of Driller Gerald J. Fick

Registration No. 490750

Signature of Property Owner Joe Baer

COPIES: Water Systems & Well Permitting - White Health Dept. - Yellow Owner - Blue Driller - White

DWR-133M
2/08

STATE OF NEW JERSEY
DEPARTMENT OF ENVIRONMENTAL PROTECTION
TRENTON, NJ

P200912473

Permit No. _____

Mail To:

NJDEP
BUREAU OF WATER SYSTEMS
AND WELL PERMITTING
PO BOX 426
TRENTON, NJ 08625-0426

MONITORING WELL PERMIT

VALID ONLY AFTER APPROVAL BY THE D.E.P.

COORD #: 31.43.678

Owner City of Vineland
Address 640 E Wood St
Vineland, NJ 08360

Driller Uni-Tech Drilling Co., Inc
Address P.O. Box 407
Franklinville NJ 08322

Name of Facility SAME
Address R.O.W. W. Arbor Ave

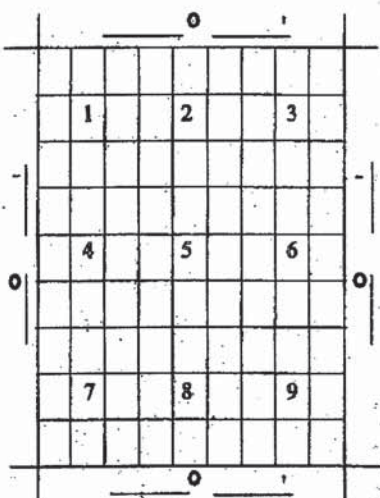
Diameter of Well(s) <u>4</u> (inches)	Proposed Depth of Well(s) <u>200</u> Feet
# of Wells Applied for (max. 10) <u>1</u>	Will pumping equipment be utilized? YES <input type="checkbox"/> NO <input checked="" type="checkbox"/>
Type of Well (see reverse) <u>Monitoring</u>	If Yes, give pump capacity _____ cumulative GPM

LOCATION OF WELL(S)

Lot # <u>R.O.W</u>	Block # <u>R.O.W</u>	Municipality <u>Vineland</u>	County <u>Cumb</u>
--------------------	----------------------	------------------------------	--------------------

State Atlas Map No. _____

Draw sketch of well(s) nearest roads, buildings, etc. with marked distances in feet. Each well MUST be labeled with a name and/or number on the sketch.



PROPOSED WELL LOCATION (NAD 83 HORIZONTAL DATUM)
NJ STATE PLANE COORDINATE IN US SURVEY FEET

NORTHING: 256016

EASTING: 343706

METHOD

- ☐ SURVEY
☒ DIGITAL IMAGE
☐ GPS

FOR MONITORING WELLS, RECOVERY WELLS, OR PIEZOMETERS, THE FOLLOWING MUST BE COMPLETED BY THE APPLICANT. PLEASE INDICATE WHY THE WELLS ARE BEING INSTALLED:

- ☐ RCRA Site
☐ Spill Site
☐ Underground Storage Tank Site
☐ ISRA Site
☐ Operational Ground Water Permit Site
☐ CERCLA (Superfund) Site
☐ Pretreatment and Residuals Site
☐ Water and Hazardous Waste Enforcement Case
☐ Water Supply Aquifer Test Observation Well
☐ Other (explain) _____

CASE I.D. Number _____

This Space for Approval Stamp

WELL PERMIT APPROVED
N.J. D.E.P.

OCT 14 2009

FOR D.E.P. USE ☐ Insurance of this permit is subject to the conditions attached. (see next page)

☒ For monitoring purposes only

SEE REVERSE SIDE FOR IMPORTANT PROVISIONS PERTAINING TO THIS PERMIT.
In compliance with N.J.S.A. 58:4A-14, application is made for a permit to drill a well as described above.

Date 10/5/09

Signature of Driller Gerald F. Fitch

Registration No. 490750

Signature of Property Owner James Paer for Brian Myers City Engineer

COPIES: Water Systems & Well Permitting - White Health Dept. - Yellow Owner - Blue Driller - White

STATE OF NEW JERSEY
DEPARTMENT OF ENVIRONMENTAL PROTECTION
TRENTON, NJ

Mail To:

NJDEP
BUREAU OF WATER SYSTEMS
AND WELL PERMITTING
PO BOX 426
TRENTON, NJ 08625-0426

MONITORING WELL PERMIT

Permit No.

P200913690

VALID ONLY AFTER APPROVAL BY THE D.E.P.

EMERGENCY

COORD #:

35.02.243

Owner City of Vineland
Address 640 E. Wood St.
Vineland, NJ 08360

Driller Uni-Tech Drilling Co Inc
Address PO Box 407
Franklinville NJ 08322

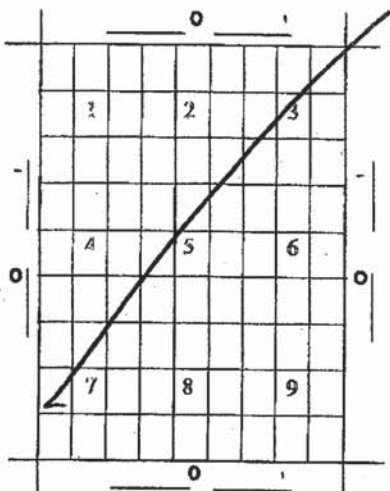
Name of Facility Same
Address ROW E. Garden Rd

Diameter of Well(s)	2"	Inches	Proposed Depth of Well(s)	100	Feet
# of Wells	1		Will pumping equipment be utilized?	N/A	YES <input type="checkbox"/> NO <input type="checkbox"/>
Applied for (max. 10)	1		If Yes, give pump capacity		
Type of Well (see reverse)	Monitoring well				cumulative GPM

LOCATION OF WELL(S)

Lot # ROW Block # ROW Municipality Vineland County Camden

State Atlas Map No. _____



Draw sketch of well(s) nearest roads, buildings, etc. with marked distances in feet. Each well MUST be labeled with a name and/or number on the sketch.



PROPOSED WELL LOCATION (NAD 83 HORIZONTAL DATUM)
NJ STATE PLANE COORDINATE IN US SURVEY FEET

NORTHING: 250488 OR EASTING: 335097
LATITUDE: 0 " LONGITUDE: 0 " "

FOR MONITORING WELLS, RECOVERY WELLS, OR PIEZOMETERS, THE FOLLOWING MUST BE COMPLETED BY THE APPLICANT. PLEASE INDICATE WHY THE WELLS ARE BEING INSTALLED:

- | | |
|---|--|
| <input type="checkbox"/> RCRA Site | <input type="checkbox"/> Spill Site |
| <input type="checkbox"/> Underground Storage Tank Site | <input type="checkbox"/> ISRA Site |
| <input type="checkbox"/> Operational Ground Water Permit Site | <input type="checkbox"/> CERCLA (Superfund) Site |
| <input type="checkbox"/> Pretreatment and Residuals Site | |
| <input type="checkbox"/> Water and Hazardous Waste Enforcement Case | |
| <input type="checkbox"/> Water Supply Aquifer Test Observation Well | |
| <input type="checkbox"/> Other (explain) _____ | |

CASE I.D. Number _____

This Space for Approval Stamp

WELL PERMIT APPROVED
NJDEP

NOV - 6 2009

BUREAU OF WATER SYSTEMS
& WELL PERMITTING

FOR D.E.P. USE ☐ Issuance of this permit is subject to the conditions attached. (see next page)

☒ For monitoring purposes only

SEE REVERSE SIDE FOR IMPORTANT PROVISIONS PERTAINING TO THIS PERMIT.

In compliance with N.J.S.A. 58:14-14, application is made for a permit to drill a well as described above.

Date 10-27-09

Signature of Driller

Sheldon K. Trusk

Registration No.

M490750

Signature of Property Owner

Madame Justice for Brian Myers, Esq.

COPIES: Water Systems & Well Permitting - White Health Dept. - Yellow Owner - Blue Driller - White

01-29-'10 13:51 FROM-Uni-Tech Drilling 856-694-4242

T-202 P0002/0002 F-060

DWR-133M
2/08STATE OF NEW JERSEY
DEPARTMENT OF ENVIRONMENTAL PROTECTION
TRENTON, NJ

Mail To:

MONITORING WELL PERMIT

NJDEP
BUREAU OF WATER SYSTEMS
AND WELL PERMITTING
PO BOX 426
TRENTON, NJ 08625-0426

VALID ONLY AFTER APPROVAL BY THE D.E.P.

Permit No.

P201000848

Drilled under
P200912476

COORD #: 31 .42 .593

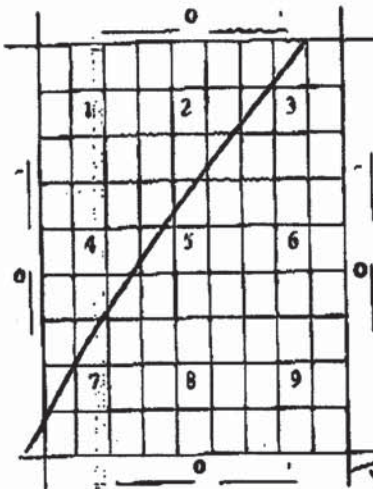
Owner City of Vineland
Address 640 E. Wood St.
Vineland, NJ 08360Driller Uni-Tech Drilling Co Inc
Address: PO Box 407
Franklinville, NJ 08322Name of Facility Same
Address R.O.W. Salem Ave
Vineland, NJ 08360

Character of Well(s)	6	Proposed Depth of Well(s)	200	Feet
# of Wells	1	Well pumping equipment	YES <input type="checkbox"/>	NO <input type="checkbox"/>
Applied for (max 10)	1	DC or AC	YES <input type="checkbox"/>	NO <input type="checkbox"/>
Type of Well (see remarks)	monitoring			
1" or 4" pipe pump		reservoir		cumulative GPM

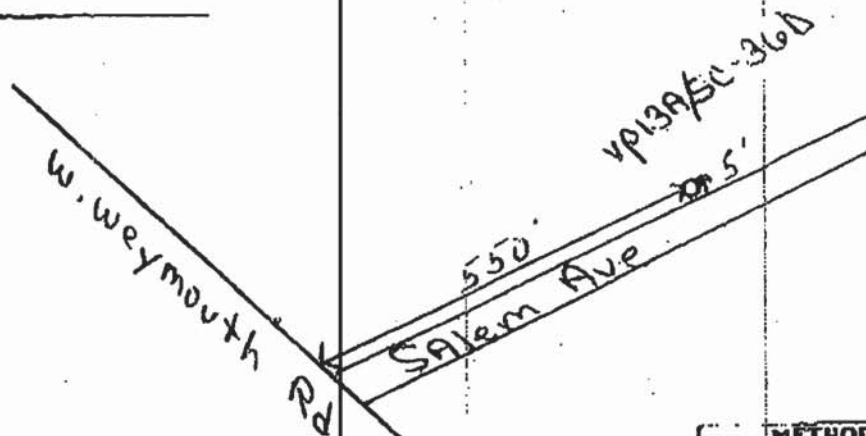
LOCATION OF WELL(S)

Lot #	Block #	Municipality	County
Row	Row	Vineland	Camden

State Atlas Map No.



Draw sketch of well(s) nearest roads, buildings, etc. with marked distances in feet. Each well MUST be labeled with a name and/or number on the sketch.

PROPOSED WELL LOCATION (NAD 83 HORIZONTAL DATUM)
NJ STATE PLANE COORDINATE IN US SURVEY FEET

NORTHING: 258468

EASTING 241251

METHOD

- ☐ SURVEY
☐ DIGITAL IMAGE
☐ GPS

FOR MONITORING WELLS, RECOVERY WELLS, OR MEZOMETERS, THE FOLLOWING MUST BE COMPLETED BY THE APPLICANT. PLEASE INDICATE WHY THE WELLS ARE BEING INSTALLED

- ☐ RCRA Site ☐ Spill Site
☐ Underground Storage Tank Site ☐ ISRA Site
☐ Operational Ground Water Permit Site ☐ CERCLA (Superfund) Site
☐ Pretreatment and Residuals Site
☐ Water and Hazardous Waste Enforcement Case
☐ Water Supply Aquifer Test Observation Well
☐ Other (explain) _____

CASE ID Number _____

This Space for Approval Stamp

RECEIVED
JAN 29 PM 2:30
WATER SUPPLY PERMITTINGFOR D.E.P. USE ☐ Issuance of this permit is subject to the conditions attached. (see next page)

For monitoring purposes only

SEE REVERSE SIDE FOR IMPORTANT PROVISIONS PERTAINING TO THIS PERMIT.
In compliance with N.J.A.C. 7:26-A.10, application is made for a permit to drill a well as described above.Date 1-29-10Signature of Driller Donald A. TruckRegistration No. 01490750Signature of Property Owner William M. Myers, Esq.

WELL PERMIT

The New Jersey Department of Environmental Protection grants this permit in accordance with your application, attachments accompanying same application, and applicable laws and regulations. This permit is also subject to further conditions and stipulations enumerated in the supporting documents which are agreed to by the permittee upon acceptance of the permit

Certifying Driller: MARK R LAURA, JOURNEYMAN LICENSE # 0001228

Permit Issued to: ZEBRA ENVIRONMENTAL INC

Company Address: 26 WEST HIGHLAND AVE ATLANTIC HIGHLANDS, NJ 07716

PROPERTY OWNER

Name: DAVID GUIDARINI

Organization: N. Vineland Car Wash

Address: 1060 New Pear St.

City: Vineland State: New Jersey Zip Code: 08360

PROPOSED WELL LOCATION

Facility Name: N. Vineland Car wash

Address: 130 West Weymouth Road

County: Cumberland Municipality: Vineland City Lot: 11 Block: 82

Easting (X): 344198 Northing (Y): 257585

Coordinate System: NJ State Plane (NAD83) - USFEET

Local ID: B-1

SITE CHARACTERISTICS

PROPOSED CONSTRUCTION

WELL USE: BORING/INDIVIDUAL

Other Use(s): _____

Diameter (in.): 2

Regulatory Program

Requiring Wells/Borings: _____

Depth (ft.): 125

Case ID Number: _____

Pump Capacity (gpm): 0

Deviation Requested: N

Drilling Method: Direct Push Probe

Attachments: _____

SPECIFIC CONDITIONS/REQUIREMENTS

Approval Date: September 29, 2010

Expiration Date: September 29, 2011

Approved by the authority of:

Bob Martin
Commissioner



John Fields, Acting Bureau Chief
Bureau of Water Systems and Well Permitting

WELL PERMIT

DEVIATION INFORMATION	
Purpose:	
Unusual Conditions:	
Reason for Deviation:	
Proposed Well Construction	

GENERAL CONDITIONS/REQUIREMENTS
A copy of this permit shall be kept at the worksite / on the property and shall be exhibited upon request. [N.J.A.C. 7:9D-1]
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In accepting this permit the Property Owner and Driller agree to abide by the following terms and conditions [N.J.A.C. 7:9D-1]
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This permit conveys no rights, either expressed, or implied to divert water. [N.J.A.C. 7:9D-1]
This permit does not waive the obtaining of Federal or other State or local Government consent when necessary. This permit is not valid and no work shall be undertaken until such time as all other required approvals and permits have been obtained. [N.J.A.C. 7:9D-1]
This permit is NONTRANSFERABLE [N.J.A.C. 7:9D]
This well shall not be used for the supply of potable / drinking water. [N.J.A.C. 7:9D-1]

WELL PERMIT

The New Jersey Department of Environmental Protection grants this permit in accordance with your application, attachments accompanying same application, and applicable laws and regulations. This permit is also subject to further conditions and stipulations enumerated in the supporting documents which are agreed to by the permittee upon acceptance of the permit

Certifying Driller: MARK R LAURA, JOURNEYMAN LICENSE # 0001228

Permit Issued to: ZEBRA ENVIRONMENTAL INC

Company Address: 26 WEST HIGHLAND AVE ATLANTIC HIGHLANDS, NJ 07716

PROPERTY OWNER

Name: DAVID GUIDARINI

Organization: N. Vineland Car Wash

Address: 1060 New Pear St.

City: Vineland State: New Jersey Zip Code: 08360

PROPOSED WELL LOCATION

Facility Name: N. Vineland Car wash

Address: 130 West Weymouth Road

County: Cumberland Municipality: Vineland City Lot: 11 Block: 82

Easting (X): 344197 Northing (Y): 257565
Coordinate System: NJ State Plane (NAD83) - USFEET

Local ID: B-2

SITE CHARACTERISTICS

PROPOSED CONSTRUCTION

WELL USE: BORING/INDIVIDUAL

Other Use(s): _____

Diameter (in.): 2

Regulatory Program

Requiring Wells/Borings: _____

Depth (ft.): 125

Case ID Number: _____

Pump Capacity (gpm): 0

Deviation Requested: N


Drilling Method: Direct Push Probe

Attachments: _____

SPECIFIC CONDITIONS/REQUIREMENTS

Approval Date: September 29, 2010
Expiration Date: September 29, 2011

Approved by the authority of:
Bob Martin
Commissioner


John Fields, Acting Bureau Chief
Bureau of Water Systems and Well Permitting

WELL PERMIT

DEVIATION INFORMATION	
Purpose:	
Unusual Conditions:	
Reason for Deviation:	
Proposed Well Construction	

GENERAL CONDITIONS/REQUIREMENTS
A copy of this permit shall be kept at the worksite / on the property and shall be exhibited upon request. [N.J.A.C. 7:9D-1]
A well record must be submitted by the well driller to the Bureau of Water Systems and Well Permitting. Unless prior written approval is obtained from the Bureau of Water Systems and Well Permitting the well record shall be submitted electronically through the New Jersey Department of Environmental Protection's Regulatory Services Portal Submit Well Record: within ninety (90) days after the well is completed.[N.J.A.C. 7:9D-1]
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If the use of the well is to be changed a well permit for the proposed use of the well shall be submitted for review and approval. [N.J.A.C. 7:9D-1]
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In accepting this permit the Property Owner and Driller agree to abide by the following terms and conditions [N.J.A.C. 7:9D-1]
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This permit conveys no rights, either expressed, or implied to divert water. [N.J.A.C. 7:9D-1]
This permit does not waive the obtaining of Federal or other State or local Government consent when necessary. This permit is not valid and no work shall be undertaken until such time as all other required approvals and permits have been obtained. [N.J.A.C. 7:9D-1]
This permit is NONTRANSFERABLE [N.J.A.C. 7:9D]
This well shall not be used for the supply of potable / drinking water. [N.J.A.C. 7:9D-1]

WELL PERMIT

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Certifying Driller: MARK R LAURA, JOURNEYMAN LICENSE # 0001228

Permit Issued to: ZEBRA ENVIRONMENTAL INC

Company Address: 26 WEST HIGHLAND AVE ATLANTIC HIGHLANDS, NJ 07716

PROPERTY OWNER

Name: DAVID GUIDARINI

Organization: N. Vineland Car Wash

Address: 1060 New Pear St.

City: Vineland State: New Jersey Zip Code: 08360

PROPOSED WELL LOCATION

Facility Name: N. Vineland Car wash

Address: 130 West Weymouth Road

County: Cumberland Municipality: Vineland City Lot: 11 Block: 82

Easting (X): 344190 Northing (Y): 257529
Coordinate System: NJ State Plane (NAD83) - USFEET

Local ID: B-3

SITE CHARACTERISTICS

PROPOSED CONSTRUCTION

WELL USE: BORING/INDIVIDUAL

Other Use(s): _____

Diameter (in.): 2

Regulatory Program

Requiring Wells/Borings: _____

Depth (ft.): 125

Case ID Number: _____

Pump Capacity (gpm): 0

Deviation Requested: N


Drilling Method: Direct Push Probe

Attachments: _____

SPECIFIC CONDITIONS/REQUIREMENTS

Approval Date: September 29, 2010
Expiration Date: September 29, 2011

Approved by the authority of:
Bob Martin
Commissioner


John Fields, Acting Bureau Chief
Bureau of Water Systems and Well Permitting

WELL PERMIT

DEVIATION INFORMATION	
Purpose:	
Unusual Conditions:	
Reason for Deviation:	
Proposed Well Construction	

GENERAL CONDITIONS/REQUIREMENTS
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This permit is NONTRANSFERABLE [N.J.A.C. 7:9D]
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WELL PERMIT

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Certifying Driller: MARK R LAURA, JOURNEYMAN LICENSE # 0001228

Permit Issued to: ZEBRA ENVIRONMENTAL INC

Company Address: 26 WEST HIGHLAND AVE ATLANTIC HIGHLANDS, NJ 07716

PROPERTY OWNER

Name: CUMBERLAND COUNTY

Organization: Cumberland County Right Of Way

Address: 800 East Commerce Street

City: Bridgeton City State: New Jersey Zip Code: 08302

PROPOSED WELL LOCATION

Facility Name: West Weymouth Right Of Way @ 158 W. Weymouth Road

Address: 158 West Weymouth Road

County: Cumberland Municipality: Vineland City Lot: 12 Block: 82

Easting (X): 344091 Northing (Y): 257430

Coordinate System: NJ State Plane (NAD83) - USFEET

Local ID: B-4

SITE CHARACTERISTICS

PROPOSED CONSTRUCTION

WELL USE: BORING/INDIVIDUAL

Other Use(s): _____

Diameter (in.): 2

Regulatory Program

Requiring Wells/Borings: _____

Depth (ft.): 125

Case ID Number: _____

Pump Capacity (gpm): 0

Deviation Requested: N

Drilling Method: Direct Push Probe

Attachments: _____

SPECIFIC CONDITIONS/REQUIREMENTS

Approval Date: September 29, 2010

Expiration Date: September 29, 2011

Approved by the authority of:

Bob Martin
Commissioner



John Fields, Acting Bureau Chief
Bureau of Water Systems and Well Permitting

WELL PERMIT

DEVIATION INFORMATION	
Purpose:	
Unusual Conditions:	
Reason for Deviation:	
Proposed Well Construction	

GENERAL CONDITIONS/REQUIREMENTS
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This permit is NONTRANSFERABLE [N.J.A.C. 7:9D]
This well shall not be used for the supply of potable / drinking water. [N.J.A.C. 7:9D-1]

WELL PERMIT

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Certifying Driller: JAMES W DUFFY, MASTER LICENSE # 0001581

Permit Issued to: EAST COAST DRILLING, INC.

Company Address: 1256 N CHURCH ST MOORESTOWN, NJ 08057

PROPERTY OWNER

Name: DAN ORR

Organization: Cumberland County Public Works

Address: 800 East Commerce Street

City: Vineland City **State:** New Jersey **Zip Code:** 08360

PROPOSED WELL LOCATION

Facility Name: Off Site North Vineland Car Wash Project

Address: W. Weymouth Road

County: Cumberland **Municipality:** Vineland City **Lot:** Right of Way **Block:** Right of Way

Easting (X): 344077 **Northing (Y):** 257434

Coordinate System: NJ State Plane (NAD83) - USFEET

Local ID: SC-37D (SC-375)

SITE CHARACTERISTICS

PROPOSED CONSTRUCTION

WELL USE: MONITORING

Other Use(s): _____

Diameter (in.): 2

Regulatory Program

Requiring Wells/Borings: Off site Geophysical Investigation

Depth (ft.): 60

Case ID Number: _____

Pump Capacity (gpm): 0

Deviation Requested: N

Drilling Method: Hollow Stem Augers

Attachments: _____

SPECIFIC CONDITIONS/REQUIREMENTS

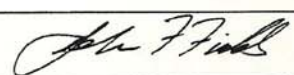
Approval Date: October 14, 2010

Expiration Date: October 14, 2011

Approved by the authority of:

Bob Martin
Commissioner

Well Permit -- Page 1 of 2


John Fields, Acting Bureau Chief
Bureau of Water Systems and Well Permitting

WELL PERMIT

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Certifying Driller: JAMES W DUFFY, MASTER LICENSE # 0001581

Permit Issued to: EAST COAST DRILLING, INC.

Company Address: 1256 N CHURCH ST MOORESTOWN, NJ 08057

PROPERTY OWNER

Name: DAVID GUIDARINI

Organization: North Vineland Car Wash

Address: 130 W. Weymouth Road

City: Vineland City **State:** New Jersey **Zip Code:** 08360

PROPOSED WELL LOCATION

Facility Name: North Vineland Car Wash

Address: 130 W. Weymouth Road

County: Cumberland **Municipality:** Vineland City **Lot:** 33 **Block:** 501

Easting (X): 344224 **Northing (Y):** 257496

Coordinate System: NJ State Plane (NAD83) - USFEET

Local ID: SC-38D

(SC-38D)

SITE CHARACTERISTICS

PROPOSED CONSTRUCTION

WELL USE: MONITORING

Other Use(s):

Diameter (in.): 8

Regulatory Program

Depth (ft.): 125

Requiring Wells/Borings: Off site Geophysical Investigation

Pump Capacity (gpm): 0

Case ID Number:

Drilling Method: Hollow Stem Augers

Deviation Requested: N

Attachments:

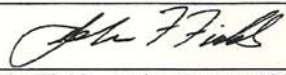
SPECIFIC CONDITIONS/REQUIREMENTS

Approval Date: October 13, 2010

Expiration Date: October 13, 2011

Approved by the authority of:

Bob Martin
Commissioner


John Fields, Acting Bureau Chief
Bureau of Water Systems and Well Permitting

TRCRE0232

APPENDIX D

MONITORING WELL CONSTRUCTION LOGS, DRILLER-CERTIFIED WELL COMPLETION FORMS (FORM A), AND WELL LOCATION CERTIFICATION FORMS (FORM B)

Supplemental Offsite Groundwater Investigation
Shieldalloy Metallurgical Corporation
Newfield, New Jersey

SOIL BORING / MONITORING WELL CONSTRUCTION LOG



Project Name: SMC Offsite Ground Water Investigation
Project Number: 112434-00GWAT-002235
Project Location: Vineland, New Jersey
Boring Location: Strawberry Lane

Drilling Company: Unitech Drilling Co., Inc.
Drillers: Dan Evans and Cunard Lopez
TRC Inspector: Rick Gille
Drill Equipment / Method: 1500 Midway Truck Rig
Mud Rotary / Pressure Tremie

Boring: SC-33D
Date Started: 10/20/2009
Date Completed: 10/22/2009
Depth to Water: NA
Horizontal Coordinates: E345190.40, N255290.06 (VP-7)
Ground Elevation: NA
Inner Casing Elevation: NA

Depth (ftbgs)	Recovery/ Penetration (inches)	Split Spoon (inches)	Blow Counts	Soil Description	Lithology	Monitoring Well Construction
10-12	19/24	6 12 18 24	14 11 11 10	Light orange/brown F-C SAND, little M-C Gravel		2" P V C
20-22	9.5/24	6 12 18 24	13 12 14 16	Light orange/brown F-M SAND, trace C Sand		
30-32	18/24	6 12 18 24	4 6 7 7	Orange/brown F SAND with inter-bedded clay layers of less than 0.5-inch thickness		
40-42	17/24	6 12 18 24	14 16 10 8	Brown F-M SAND with inter- bedded pale gray clay layers of less than 0.5-inch thickness		
50-52	13/24	6 12 18 24	26 14 16 19	Brown M SAND		
60-62	9.5/12	6 12	36 50/6"	Light brown/tan M-C SAND Spoon refusal at 61-ftbgs.		
70-72	9.5/12	6 12	34 50/6"	Pale gray (almost white) M-C SAND Spoon refusal at 71-ftbgs.		
80-82	12/18	6 12 18	29 40 50/6"	Light brown/tan M-C SAND, little F Gravel Pale gray M-C SAND Spoon refusal at 81.5-ftbgs.		
90-92	12/12	6 12	36 50/6"	Brown M-C SAND, trace F Gravel Spoon refusal at 91-ftbgs.		

Legend

- Sand
- Sand and Clay
- # 0 Well Sand
- # 00 Well Sand
- Grout
- Screen (10-slot PVC)
- Concrete Pad
- PVC Riser

WELL CONSTRUCTION:

10-Slot PVC Screen (2") = 92.5-82.5 ftbgs
PVC Riser (2") = 92.5 ftbgs-grade
0 Well Sand = 92.5-79.5 ftbgs
#00 Well Sand = 79.5-75 ftbgs
Grout (bentonite/cement mixture) = 75-2 ftbgs
Native Backfill = 2-0.5 ftbgs
Concrete Pad = 0.5-grade
Monitoring well secured with a locking sanitary plug.
Monitoring well completed with a flush-mounted curb box.

NOTES:

ftbgs - feet below ground surface.
NA - Data not available at time of reporting.
Horizontal datum (New Jersey State Plane Coordinates, NAD 83).
Samples collected for geological description every 10 feet using split spoon (140 lb hammer dropped 30").
Monitoring well developed using whale pumps in series and using surge and pump technique.

Supplemental Offsite Groundwater Investigation
Shieldalloy Metallurgical Corporation
Newfield, New Jersey

SOIL BORING / MONITORING WELL CONSTRUCTION LOG



Project Name: SMC Offsite Ground Water Investigation
Project Number: 112434-00GWAT-002235
Project Location: Vineland, New Jersey
Boring Location: West Arbor Avenue

Drilling Company: Unitech Drilling Co., Inc.
Drillers: Dan Evans and Cunard Lopez
TRC Inspector: Rick Gille
Drill Equipment / Method: 1500 Midway Truck Rig
Mud Rotary / Pressure Tremie

Boring: SC-34D
Date Started: 10/21/2009
Date Completed: 10/22/2009
Depth to Water: NA
Horizontal Coordinates: E343697.27, N255969.96 (VP-8)
Ground Elevation: NA
Inner Casing Elevation: NA

Depth (ftbgs)	Recovery/ Penetration (inches)	Split Spoon (inches)	Blow Counts	Soil Description	Lithology	Monitoring Well Construction
10-12	9.5/24	6 12 18 24	4 14 22 18	M GRAVEL, little C Sand Light brown F-M SAND, little C Sand		2" P V C
20-22	13/24	6 12 18 24	8 15 25 42	Light brown F-M SAND		
30-32	20/24	6 12 18 24	8 9 19 22	Light gray CLAY, little Silt Brown F-M SAND with inter-bedded gray clay layers of less than 0.5- inch thickness, trace C sand and silt		
40-42	18/24	6 12 18 24	10 10 10 14	Gray CLAY Brown F-M SAND Brown F SAND with inter-bedded clay layers ~0.1' in thickness		
50-52	13/24	6 12 18 24	17 19 19 11	Light brown F SAND, little Silt		
60-62	15.5/24	6 12 18 24	19 37 30 30	Light brown M SAND		
70-72	11/18	6 12 18	30 35 50/6"	Red M SAND Reddish brown M-C SAND Spoon refusal at 71.5-ftbgs.		
80-82	9.5/24	6 12 18 24	7 4 4 13	Brown M-C SAND		
90-92	18/23	6 12 18 24	15 19 34 50/5"	Brown M SAND Brown F SAND Brown M SAND Spoon refusal at 91.9-ftbgs.		
100-102	8.5/12	6 12	26 50/5"	Light brown/gray M SAND		
110-112	14/24	6 12 18 24	5 10 20 30	Brown F SAND, some Silt Brown M SAND		
120-122	2/2	6	50/3"	Brown M SAND Spoon refusal at 120.2-ftbgs.		
130-132	5/6	6	50/5"	Brown M SAND Spoon refusal at 130.5-ftbgs.		
140-142	21.5/24	6 12 18 24	3 3 6 13	Black F SAND, little silt		

Legend

- Sand
- Sand and Clay
- # 0 Well Sand
- # 00 Well Sand
- Grout
- Screen (10-slot PVC)
- Concrete Pad
- PVC Riser

WELL CONSTRUCTION:
10-Slot PVC Screen (2") = 140-130 ftbgs
PVC Riser (2") = 130 ftbgs-grade
0 Well Sand = 142-127 ftbgs
#00 Well Sand = 127-125 ftbgs
Grout (bentonite/cement mixture) = 125-4 ftbgs
Native Backfill = 4-0.5 ftbgs
Concrete Pad = 0.5-grade
Monitoring well secured with a locking sanitary plug.
Monitoring well completed with a flush-mounted curb box.

NOTES:
ftbgs - feet below ground surface.
NA - Data not available at time of reporting.
Horizontal datum (New Jersey State Plane Coordinates, NAD 83).
Samples collected for geological description every 10 feet using split spoon (140 lb hammer dropped 30").
Monitoring well developed using whale pumps in series and using surge and pump technique.

Supplemental Offsite Groundwater Investigation
Shieldalloy Metallurgical Corporation
Newfield, New Jersey



SOIL BORING / MONITORING WELL CONSTRUCTION LOG

Project Name: SMC Offsite Ground Water Investigation
Project Number: 112434-00GWAT-002235
Project Location: Vineland, New Jersey
Boring Location: West Garden Road

Drilling Company: Unitech Drilling Co., Inc.
Drillers: Dan Evans and Joe Evans
TRC Inspector: Paul Cyr
Drill Equipment / Method: 1500 Midway Truck Rig
Mud Rotary / Pressure Tremie

Boring: SC-35D
Date Started: 10/29/2009
Date Completed: 10/29/2009
Depth to Water: NA
Horizontal Coordinates: E335051.78, N251029.52 (VP-15A)
Ground Elevation: NA
Inner Casing Elevation: NA

Depth (ftbgs)	Recovery/ Penetration (inches)	Split Spoon (inches)	Blow Counts	Soil Description	Lithology	Monitoring Well Construction
10-12	20/24	6	10	Light brown F SAND, trace M Sand		
		12	14	and M Gravel		
		18	15	Gray CLAY, trace C Gravel		
		24	17			
20-22	8/18	6	25	Light brown F-M SAND, trace C		
		12	30	Gravel		
		18	50/5"	Spoon refusal at 21.5-ftbgs.		
30-32	12/18	6	30	Light brown/orange F-M SAND,		
		12	35	trace C Sand, trace F-M gravel		
		18	50-5"	Spoon refusal at 31.5-ftbgs.		
40-42	11/24	6	10	Red/orange/brown M-C SAND,		
		12	15	little M-C Gravel, trace F sand		
		18	19	and F gravel		
		24	17			
50-52	20/20	6	24	Dark red/brown F SAND		
		12	36	C GRAVEL, trace M Gravel		
		18	50/7"	Spoon refusal at 51.7-ftbgs.		
60-62	11/24	6	14	Gray CLAY and inter-bedded		
		12	10	red/brown F SAND		
		18	22			
		24	24			
70-72	9.5/18	6	10	Light brown F SAND, inter-bedded		
		12	31	thin Clay layers		
		18	50/5"	Red-brown F SAND, inter-bedded		
				thin Clay layers		
				Spoon refusal at 71.5-ftbgs.		
80-82	11/24	6	15	Light brown F SAND, inter-bedded		
		12	25	thin Silt layers		
		18	36			
		24	40			
90-92	12/24	6	9	Light brown F SAND, trace C		
		12	8	Gravel		
		18	18			
		24	22			
100-102	19/24	6	10	Light brown F SAND, inter-bedded		
		12	11	thin Clay layers		
		18	13			
		24	15			

Legend

- Sand
- Sand and Clay
- #0 Well Sand
- #00 Well Sand
- Grout
- Screen (10-slot PVC)
- Concrete Pad
- PVC Riser

WELL CONSTRUCTION:

10-Slot PVC Screen (2") = 99.5-89.5 ftbgs
PVC Riser (2") = 89.5 ftbgs-grade
#0 Well Sand = 99.5-86 ftbgs
#00 Well Sand = 86-84 ftbgs
Grout (bentonite/cement mixture) = 84-2 ftbgs
Native Backfill = 2-0.5 ftbgs
Concrete Pad = 0.5-grade
Monitoring well secured with a locking sanitary plug.
Monitoring well completed with a flush-mounted curb box.

NOTES:

ftbgs - feet below ground surface.
NA - Data not available at time of reporting.
Horizontal datum (New Jersey State Plane Coordinates, NAD 83).
Samples collected for geological description every 10 feet using split spoon (140 lb hammer dropped 30").
Monitoring well developed using whale pumps in series and using surge and pump technique.

Supplemental Offsite Groundwater Investigation
Shieldalloy Metallurgical Corporation
Newfield, New Jersey

SOIL BORING / MONITORING WELL CONSTRUCTION LOG



Project Name: SMC Offsite Ground Water Investigation
Project Number: 112434-00GWAT-002235
Project Location: Vineland, New Jersey
Boring Location: Salem Avenue

Drilling Company: Unitech Drilling Co., Inc.
Drillers: Dan Evans and Joe Evans
TRC Inspector: Paul Cyr
Drill Equipment / Method: 1500 Midway Truck Rig
Mud Rotary / Pressure Tremie

Boring: SC-36D
Date Started: 11/3/2009
Date Completed: 11/4/2009
Depth to Water: NA
Horizontal Coordinates: E341283.30, N258484.52 (VP-13A)
Ground Elevation: NA
Inner Casing Elevation: NA

Depth (ftbgs)	Recovery/ Penetration (inches)	Split Spoon (inches)	Blow Counts	Soil Description	Lithology	Monitoring Well Construction
10-12	11/24	6 12 18 24	12 16 26 29	Red/orange/brown M-C SAND, trace C Gravel Red-brown M-C SAND Light brown - red-brown F SAND		2" P V C
20-22	8/24	6 12 18 24	16 18 17 17	Medium brown F SAND, thin Clay layer at 20-ftbgs.		
30-32	24/24	6 12 18 24	22 24 17 18	Cobbles Red-brown F SAND Tan CLAY		
40-42	15.5/24	6 12 18 24	20 20 29 37	Tan CLAY Red-brown F-M SAND		
50-52	8/11	6 12	36 50/5"	Red-brown M-C SAND, little M Gravel, trace clay, trace C gravel Spoon refusal at 51-ftbgs.		
60-62	23/24	6 12 18 24	13 8 14 20	Tan-medium brown CLAY, trace F Sand Medium brown F SAND Tan CLAY, trace F Sand Red-brown F SAND, trace clay Medium to light brown F SAND		
70-72	19/24	6 12 18 24	8 10 7 8	Gray-brown CLAY and F SAND Medium brown F SAND, trace Clay Red-brown F SAND CLAY, trace F Sand		
80-82	19/24	6 12 18 24	13 7 14 20	Tan CLAY Medium brown F SAND, trace Clay		
90-92	14/24	6 12 18 24	16 9 15 23	Medium brown F SAND, trace Clay		
100-102	18/24	6 12 18 24	13 18 26 26	Tan CLAY, trace M Gravel Red-brown F SAND, trace Clay		
105-107	12/24	6 12 18 24	18 20 23 30	Cobbles, trace F Sand Tan CLAY, trace F Sand Red-brown F SAND, trace M Gravel, trace clay		
110-112	12/24	6 12 18 24	9 9 15 23	Medium brown F SAND, trace Clay		

Legend

- Sand
- Sand and Clay
- # 0 Well Sand
- # 00 Well Sand
- Grout
- Screen (10-slot PVC)
- Concrete Pad
- PVC Riser

WELL CONSTRUCTION:
10-Slot PVC Screen (2") = 117-107 ftbgs
PVC Riser (2") = 107 ftbgs-grade
0 Well Sand = 117-102 ftbgs
#00 Well Sand = 102-100 ftbgs
Grout (bentonite/cement mixture) = 100-1 ftbgs
Native Backfill = 1-0.5 ftbgs
Concrete Pad = 0.5-grade
Monitoring well secured with a locking sanitary plug.
Monitoring well completed with a flush-mounted curb box.

NOTES:
ftbgs - feet below ground surface.
NA - Data not available at time of reporting.
Horizontal datum (New Jersey State Plane Coordinates, NAD 83).
Samples collected for geological description every 10 feet using split spoon (140 lb hammer dropped 30").
Monitoring well developed using whale pumps in series and using surge and pump technique.

**Environmental Corporation**

57 E. Willow Street, Millburn, NJ 07041 (973) 564-6006

WELL LOG

WELL NUMBER

SC-37S

WELL PERMIT NUMBER

PROJECT NAME: SMC

LOCATION: Vineland, New Jersey

PROJECT NO.: 2710-112434

CONTRACTOR: ECDI

SAMPLER TYPE/DIA.: Macrocore 2"

TYPE OF WELL: Monitoring

DEPTH TO BEDROCK: Not Encountered

DRILLING METHOD: Hollow Stem Auger

TOTAL DEPTH DRILLED: 30 feet

BIT TYPE: Auger bit

START DATE: 10/20/10

FINISH DATE: 10/20/10

DRILLER: W. Reeves

LOGGED BY: G. Nicaretta

DEPTH FROM SURFACE (FEET)	BLOW COUNT PER 6 IN.	RECOVERY (INCHES)	PID (ppm)	SAMPLE DESIGNATION	WELL DIAGRAM	UNIFIED	LITHOLOGIC CLASSIFICATION AND COMMENTS
0							
2							0 to 18': Continuous Drilling: Orange fine to medium SAND with some pebbles.
4							
6							
8							
10							
12							
14							
16							
18							
20		24	ND				18 to 19.5' - Orange large grained SAND, wet.
22							19.5 to 22' - Orange fine to medium grained SAND, wet.
24		60					22.5 to 26.5' - Orange large grained SAND, wet.
26							
28		45					26.5 to 30' - Orange very fine SAND, little silt, wet.
30			ND				
CASING TYPE/DIAMETER (IN.)					STATIC WATER LEVEL: 5.29 (10/20/10) feet below surface		
INNER: 2 OUTER: NA					DEPTH WATER ENCOUNTERED: 5.00 feet below surface		
SCREENED OR OPEN INTERVAL: 20 - 25 (FEET BELOW SURFACE)					MEASURING POINT ELEVATION: ft., msl		
					GROUND SURFACE ELEVATION: ft., msl		

Well Construction Details

0 to 20 ft. below surface - 2" diameter PVC riser
 20 to 25 ft. below surface - 2" diameter 0.01 slot PVC screen
 0 to 14 ft. below surface - cement grout
 14 to 15 ft. below surface - bentonite slurry
 15 to 25 ft. below surface - No. 0 sand

**Environmental Corporation**

57 E. Willow Street, Millburn, NJ 07041 (973) 564-6006

WELL LOG

WELL NUMBER

SC-38I

WELL PERMIT NUMBER

PROJECT NAME: SMC

LOCATION: Vineland, New Jersey

PROJECT NO.: 2710-112434

CONTRACTOR: ECDI

SAMPLER TYPE/DIA.: split spoon/2"

TYPE OF WELL: Monitoring

DEPTH TO BEDROCK: Not Encountered

DRILLING METHOD: Hollow Stem Auger

TOTAL DEPTH DRILLED: 54 feet

BIT TYPE: Auger bit

START DATE: 10/19/10

FINISH DATE: 10/19/10

DRILLER: W. Reeves

LOGGED BY: G. Nicaretta

DEPTH FROM SURFACE (FEET)	BLOW COUNT PER 6 IN.	RECOVERY (INCHES)	PID (ppm)	SAMPLE DESIGNATION	WELL DIAGRAM	UNIFIED	LITHOLOGIC CLASSIFICATION AND COMMENTS
0							
2							0 to 40': Continuous Drilling: Orange fine to medium SAND with some pebbles.
4							
6							
8							
10							
12							
14							
16							
18							
20							
22							
24							
26							
28							
30							

CASING TYPE/DIAMETER (IN.)	STATIC WATER LEVEL: <u>6.85 (10/19/10)</u> feet below surface
INNER: <u>2</u> OUTER: <u>NA</u>	DEPTH WATER ENCOUNTERED: <u>13.00</u> feet below surface
SCREENED OR OPEN INTERVAL: <u>40 - 50</u> (FEET BELOW SURFACE)	MEASURING POINT ELEVATION: _____ ft., msl
	GROUND SURFACE ELEVATION: _____ ft., msl

**Environmental Corporation**

57 E. Willow Street, Millburn, NJ 07041 (973) 564-6006

WELL LOG

WELL NUMBER

SC-38I

DEPTH FROM SURFACE (FEET)	BLOW COUNT PER 6 IN.	RECOVERY (INCHES)	PID (ppm)	SAMPLE DESIGNATION	WELL DIAGRAM	UNIFIED	LITHOLOGIC CLASSIFICATION AND COMMENTS
32							
34							
36							
38							
40							
42		24	ND				40 to 54' - Orange fine to medium grained SAND, wet.
44		10	I				
46		15	I				
48		12	I				
50		18	ND				
52		18	2.3				
54		15	4.9				
			5.4				
			13.3				
			15.3				
							End of boring at 54'
							<u>Well Construction Details</u> 0 to 45 ft. below surface - 2" diameter PVC riser 45 to 50 ft. below surface - 2" diameter 0.01 slot PVC screen 0 to 38 ft. below surface - cement grout 38 to 40 ft. below surface - bentonite slurry 40 to 50 ft. below surface - No. 0 sand

MONITORING WELL RECORD

Atlas Sheet Coordinates
3502321

OWNER IDENTIFICATION VINELAND CITY

Address 640 E. WOOD ST.

City Vineland State New Jersey Zip Code 08360

WELL LOCATION - If not the same as owner please give address

Owner's Well No. SC 33D

County Cumberland Municipality Vineland City

Lot No. ROW Block No. ROW

Address STRAWBERRY AVE. ROW VP-7

WELL USE Monitoring

DATE WELL STARTED 10-20-09

DATE WELL COMPLETED 10-22-09

WELL CONSTRUCTION

Total Depth Drilled 94 ft.

Finished Well Depth 92.5 ft.

Borehole Diameter:

Top 6 in.

Bottom 6 in.

Well was finished: ☐ above grade
☒ flush mounted

If finished above grade, casing height
(stick up) above land surface ft.

Steel protective casing installed?

☒ Yes ☐ No

Static Water Level after drilling 21 ft.

Water Level was Measured Using M-Scope

Well was developed for 2 hours

at 1.5 gpm

Method of development Pump & Surge

Pump Capacity gpm

Pump Type whaler

Drilling Fluid Quick Gel Type of Rig 1500 Failing

Health and Safety Plan Submitted? ☐ Yes ☒ No

Level of Protection used on site (circle one) None (D) C B A

Note: Measure all depths from land surface	Depth to Top (ft.)	Depth to Bottom (ft.)	Diameter (inches)	Material	Wgt./Rating (lbs/sch no.)
Single/Inner Casing	0	82.5	2	PVC	Sch 40
Middle Casing (for triple cased wells only)					
Outer Casing (largest diameter)					
Open Hole or Screen (No. Used .010)	82.5	92.5	2	PVC	Sch 40
Blank Casings (No. Used)					
Tail Piece					
Gravel Pack	77.5	94		#000/#0	100#/300#
Grout	0	77.5		Neat Cement Bentonite	800 lbs 50 lbs

Grouting Method Tremie Pressure

Drilling Method Mud Rotary

GEOLOGIC LOG

Note each depth where water was encountered in consolidated formations

0-20 Bcn/org C-F sand

20-94 Wet brn/C-F sand

I certify that I have constructed the above referenced well in accordance with all well permit requirements and applicable State rules and regulations.

Drilling Company UNI-TECH DRILLING CO INC

Well Driller (Print) Daniel Evans

Driller's Signature Daniel Evans

Registration No. JD 294368 Date 10/30/09

**AS-BUILT WELL LOCATION
(NAD 83 HORIZONTAL DATUM)**

NJ STATE PLANE COORDINATE IN US SURVEY FEET

NORTHING: EASTING:

OR

LATITUDE: LONGITUDE:

ORIGINAL: DEP

COPIES: DRILLER

OWNER

HEALTH DEPARTMENT

MONITORING WELL CERTIFICATION - FORM A - AS-BUILT CERTIFICATION

Name of Owner: Vineland City
Name of Facility: Shieldalloy
Location: R.O.W. Strawberry Ave. Vineland, NJ
UST Registration No.: _____ BUST case No.: _____

CERTIFICATION

Well Permit Number: P200912475 Owner's Well Number SC33D
Well Completion Date: 10-22-09 Lithologic Log: Attach
Distance from Top of Casing (cap off) to
ground surface (one-hundredth of a foot): 0
Total Depth of Well to the nearest 1/2 foot: 92.5
Depth to Top of Screen (or Top of Open Hole)
From Top of Casing (one-hundredth of a foot): 82.5
Screen Length (or length of open hole) in feet: 10
Screen or Slot Size: .010
Screen or Slot Material: PVC
Casing Material: (PVC, Steel or Other-Specify): PVC
Casing Diameter (inches): 2
Static Water Level From Top of Casing at the Time
of Installation (one-hundredth of a foot): 21
Yield (gallons per minute): 1.5
Development Technique (specify): pump & surge
Length of Time Well is Developed/Pumped or Bailed: 2 Hours Minutes

Authentication

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Technical Certification:

Daniel Evans Daniel Evans
Name (Type or Print) Signature

JD 294368
Certification or License No.

Seal

Certification by Executive Officer or Duly Authorized Representative:

Name (Type or Print) Signature Date
Title: _____

MONITORING WELL RECORD

OWNER IDENTIFICATION VINELAND CITY

Address 640 E. WOOD ST.

City Vineland State New Jersey Zip Code 08360

WELL LOCATION - If not the same as owner please give address

Owner's Well No. SC 34D

County Cumberland Municipality Vineland City Lot No. ROW Block No. ROW

Address WEST ARBOR AVE. ROW VP-8

WELL USE Monitoring

DATE WELL STARTED 10-21-09

DATE WELL COMPLETED 10-22-09

WELL CONSTRUCTION

Total Depth Drilled 142 ft.

Finished Well Depth 140 ft.

Borehole Diameter:

Top 6 in.

Bottom 6 in.

Well was finished: ☐ above grade

☒ flush mounted

If finished above grade, casing height (stick up) above land surface _____ ft.

Steel protective casing installed?

☒ Yes ☐ No

Static Water Level after drilling 19 ft.

Water Level was Measured Using M-Scope

Well was developed for 2 hours

at 1.5 gpm

Method of development pump & surge

Pump Capacity _____ gpm

Pump Type Whaler

Drilling Fluid Quick Gel Type of Rig 1500 Failing

Health and Safety Plan Submitted? ☐ Yes ☒ No

Level of Protection used on site (circle one) None (D) C B A

Note: Measure all depths from land surface	Depth to Top (ft.)	Depth to Bottom (ft.)	Diameter (inches)	Material	Wgt./Rating (lbs/sch no.)
Single/Inner Casing	<u>0</u>	<u>130</u>	<u>2</u>	<u>PVC</u>	<u>Sch 40</u>
Middle Casing (for triple cased wells only)					
Outer Casing (largest diameter)					
Open Hole or Screen (No. Used <u>.010</u>)	<u>130</u>	<u>140</u>	<u>2</u>	<u>PVC</u>	<u>Sch 40</u>
Blank Casings (No. Used)					
Tail Piece					
Gravel Pack	<u>125</u>	<u>142</u>		<u>#000/#0</u>	<u>100#/300#</u>
Grout	<u>0</u>	<u>125</u>		<u>Neat Cement Bentonite</u>	<u>1200 lbs 75 lbs</u>

Grouting Method Tremie Pressure

Drilling Method Mud Rotary

GEOLOGIC LOG

Note each depth where water was encountered in consolidated formations

0-20 Brn/Orange C-F Sand
20-130 Or/Tan C-F sand w/gravel
130-140 Black M-F sand

I certify that I have constructed the above referenced well in accordance with all well permit requirements and applicable State rules and regulations.

Drilling Company UNI-TECH DRILLING CO INC

Well Driller (Print) Daniel Evans

Driller's Signature Daniel Evans

Registration No. JD 294368 Date 10/30/09

**AS-BUILT WELL LOCATION
(NAD 83 HORIZONTAL DATUM)**

NJ STATE PLANE COORDINATE IN US SURVEY FEET

NORTHING: _____ EASTING: _____

OR

LATITUDE: _____ LONGITUDE: _____

MONITORING WELL CERTIFICATION - FORM A - AS-BUILT CERTIFICATION

Name of Owner: Vineland City
Name of Facility: Shield alloy
Location: R.O.W. W. Arbor Ave Vineland, NJ
UST Registration No.: _____ BUST case No.: _____

CERTIFICATION

Well Permit Number: P200912473 Owner's Well Number SC34D
Well Completion Date: 10-22-09 Lithologic Log: Attach
Distance from Top of Casing (cap off) to
ground surface (one-hundredth of a foot): 0
Total Depth of Well to the nearest 1/2 foot: 140
Depth to Top of Screen (or Top of Open Hole)
From Top of Casing (one-hundredth of a foot): 130
Screen Length (or length of open hole) in feet: 10
Screen or Slot Size: .010
Screen or Slot Material: PVC
Casing Material: (PVC, Steel or Other-Specify): PVC
Casing Diameter (inches): 2
Static Water Level From Top of Casing at the Time
of Installation (one-hundredth of a foot): 19
Yield (gallons per minute): 1.5
Development Technique (specify): pump & surge
Length of Time Well Is Developed/Pumped or Bailed: 2 Hours Minutes

Authentication

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Technical Certification:

Daniel Evans Daniel Evans
Name (Type or Print) Signature

JD 294368
Certification or License No.

Seal

Certification by Executive Officer or Duly Authorized Representative:

Name (Type or Print) Signature Date
Title: _____

P200913690

Atlas Sheet Coordinates

MONITORING WELL RECORD

OWNER IDENTIFICATION

Address 640 E. WOOD ST
City Vineland State NJ Zip Code 08360

WELL LOCATION - If not the same as owner please give address

County Cumberland Municipality Vineland City Owner's Well No. SC35D
Lot No. ROW Block No. ROW

Address W. Garden Rd

WELL USE Monitoring

DATE WELL STARTED 10-29-09

DATE WELL COMPLETED 11-6-09

WELL CONSTRUCTION

Total Depth Drilled 100 ft.

Finished Well Depth 100 ft.

Borehole Diameter:

Top 6 in.

Bottom 6 in.

Well was finished: ☐ above grade
☒ flush mounted

If finished above grade, casing height (stick up) above land surface ft.

Steel protective casing installed?

☒ Yes ☐ No

Static Water Level after drilling 15 ft.

Water Level was Measured Using M-Scope

Well was developed for 2 hours

at 1.4 gpm

Method of development pump & surge

Pump Capacity 1.4 gpm

Pump Type whaler

Drilling Fluid Quick Gel Type of Rig 1500 Failing

Health and Safety Plan Submitted? ☐ Yes ☒ No

Level of Protection used on site (circle one) None (D) C B A

Note: Measure all depths from land surface	Depth to Top (ft.)	Depth to Bottom (ft.)	Diameter (inches)	Material	Wgt./Rating (lbs/sch no.)
Single/Inner Casing	<u>0</u>	<u>90</u>	<u>2</u>	<u>PVC</u>	<u>Sch 40</u>
Middle Casing (for triple cased wells only)					
Outer Casing (largest diameter)					
Open Hole or Screen (No. Used)	<u>90</u>	<u>100</u>	<u>2</u>	<u>PVC</u>	<u>Sch 40</u>
Blank Casings (No. Used)					
Tail Piece					
Gravel Pack	<u>85</u>	<u>100</u>		<u>#000/#0</u>	<u>100#/300#</u>
Grout	<u>0</u>	<u>85</u>		<u>Neat Cement Bentonite</u>	<u>600 lbs 30 lbs</u>

Grouting Method Tremie Pressure

Drilling Method Mid Rotary

GEOLOGIC LOG

Note each depth where water was encountered in consolidated formations

0-10 Tan/orange C-F sand w/ gravel

20-60 Tan/brown/red C-F sand & gravel

60-70 Silty Clay w/ F sand

70-100 Silty F sand w/ clay lenses

I certify that I have constructed the above referenced well in accordance with all well permit requirements and applicable State rules and regulations.

Drilling Company UNI-TECH DRILLING CO INC

Well Driller (Print) Daniel Evans

Driller's Signature Daniel Evans

Registration No. JD294368 Date 11/10/09

MONITORING WELL CERTIFICATION - FORM A - AS-BUILT CERTIFICATION

Name of Owner: Vineland City
Name of Facility: Shieldalloy
Location: Garden Road R.O.W. Vineland NJ
UST Registration No.: _____ BUST case No.: _____

CERTIFICATION

Well Permit Number: 200913690 - _____ Owner's Well Number SC35D
Well Completion Date: _____ Lithologic Log: Attach
Distance from Top of Casing (cap off) to
ground surface (one-hundredth of a foot): 0
Total Depth of Well to the nearest 1/2 foot: 100
Depth to Top of Screen (or Top of Open Hole)
From Top of Casing (one-hundredth of a foot): 90
Screen Length (or length of open hole) in feet: 10
Screen or Slot Size: .010
Screen or Slot Material: PVC
Casing Material: (PVC, Steel or Other-Specify): PVC
Casing Diameter (inches): 2
Static Water Level From Top of Casing at the Time
of Installation (one-hundredth of a foot): 15
Yield (gallons per minute): 1.4
Development Technique (specify): pump & surge
Length of Time Well is Developed/Pumped or Bailed: 2 Hours Minutes

Authentication

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Technical Certification:

Daniel Evans Danice Evans
Name (Type or Print) Signature

JD 294368
Certification or License No.

Seal

Certification by Executive Officer or Duly Authorized Representative:

Name (Type or Print) Signature Date
Title: _____

MONITORING WELL CERTIFICATION - FORM A - AS-BUILT CERTIFICATION

Name of Owner: City of Vineland
Name of Facility: Shield alloy
Location: Salem Ave R.O.W.
UST Registration No.: _____ BUST case No.: _____

CERTIFICATION

Well Permit Number: P201000848 Owner's Well Number SC36D
Well Completion Date: 11-4-09 Lithologic Log: Attach
Distance from Top of Casing (cap off) to
ground surface (one-hundredth of a foot): 0
Total Depth of Well to the nearest 1/2 foot: 117
Depth to Top of Screen (or Top of Open Hole)
From Top of Casing (one-hundredth of a foot): 107
Screen Length (or length of open hole) in feet: 117
Screen or Slot Size: .010
Screen or Slot Material: PVC
Casing Material: (PVC, Steel or Other-Specify): PVC
Casing Diameter (Inches): 2
Static Water Level From Top of Casing at the Time
of Installation (one-hundredth of a foot): 12
Yield (gallons per minute): 1.5
Development Technique (specify): pumping
Length of Time Well Is Developed/Pumped or Bailed: 2 Hours Minutes

Authentication

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Technical Certification:

Daniel Evans Daniel Evans
Name (Type or Print) Signature

JD 294368
Certification or License No.

Seal

Certification by Executive Officer or Duly Authorized Representative:

Name (Type or Print)

Signature

Date

Title: _____

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Version: 4.6

UNIT

Currently logged in: Gerald Freck (GFRECK)

UNI-TECH DRILLING CO INC

[Help](#) | [Logout](#)**APPLICATION DISPLAY****WELL RECORD SUBMITTAL PDF****PROPERTY OWNER:**

VINELAND CITY

Organization:

Address:

640 E. WOOD ST., Vineland (Cumberland), New Jersey 08360

WELL LOCATION:

Address:

SALEM AVE VP-13A/SC-36D

County:

Cumberland

Municipality:

Vineland City

Lot:

ROW

Block:

ROW

Easting(X):

341283

Northing(Y):

258484

Coordinate System:

NJ State Plane (NAD83) - USFEET

Method:

GPS

Point of Reference:

Well

GPS Manufacturer:

MAGELLAN

Surveyor Name:

GPS Model:

MOBIL MAPPER CX

Surveyor License #:

Accuracy:

1

Accuracy units:

Feet

WELL USE:

Monitoring

DATE WELL STARTED:

11/03/2009

Other Use(s):**DATE WELL COMPLETED:**

11/04/2009

WELL CONSTRUCTION**Permit Number**

P201000848

Total Depth Drilled(ft.):

117

Drilling Company:

Local ID:

VP13A/SC-36D

Finished Well Depth(ft.):

117

Driller Name:

Gerald Freck

Well was finished:

Flush Mount

License No.:

490750

blank row

	Depth to Top (ft.)	Depth to Bottom (ft.)	Diameter (Inches)	Material	Wgt./Rating/Screen Slot # (lbs/sch no.)
Borehole(s)	0	117	6	N/A	N/A
Casing(s)	0	107	2	PVC	SCH 40
Screen(s)	107	117	2	PVC	.010

blank row

	Depth to Top (ft.)	Depth to Bottom (ft.)	Outer Diameter (in)	Inner Diameter (in)	Material Bentonite (lbs.)	Neat Cement (lbs.)	Water (gal.)
Grout	0	100	6	2	36	678	60
Gravel Pack 102	117	117	6	2	0 GRAVEL		
Gravel Pack 100	102	102	6	2	00 GRAVEL		

Grouting Method:

Pressure method (Tremie Pipe)

Drilling Method:

Mud Rotary

Additional Information:

Attachments:

RECORD OF TEST

Test Date:

Depth to Pump:

ft. below land surface

Static Water Level:

12 ft. below land surface

Pump Capacity:

gpm

Pumping Water Level:

ft. below land surface

Total Design Head:

ft.

Water Level Measure Tool:

Pump Horsepower:

Pumping Equipment:

If pump tested

Discharge Rate:

gpm

Well Yield:

gpm

Duration of Test:

hours

Date Boring Decommissioned:

PUMPING EQUIPMENT AND ADDITIONAL

Well Development Period:

hours

INFORMATION

Installed:

Method of Development:

Installer's Name:

Protective Casing:

Yes

Installer's Registration No.:

Drilling Fluid:

BENTONITE

Pump Type:

Drill Rig:

1500 FAILING

Health and Safety Plan:

Yes

GEOLOGIC LOG

Depth to Top	Depth to Bottom	Color	USCS	Additional Description
0	12	RED/BROWN	SW - Well-graded sands and gravelly sands, little or no fines	
12	30	BROWN/RED	GP - Poorly graded gravels and gravel-sand mixtures, little or no fines	
30	42	TAN/RED/BROWN	GC - Clayey gravels, gravel-sand-clay mixtures	
42	80	TAN/BROWN	SC - Clayey sands, sand-clay mixtures	
80	100	BROWN	SW - Well-graded sands and gravelly sands, little or no fines	
100	117	RED/BROWN	GW - Well-graded gravels and gravel-sand mixtures, little or no fines	

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Department of Environmental Protection

P. O. Box 402

Trenton, NJ 08625-0402

Last Updated: June 24, 2004

MONITORING WELL CERTIFICATION FORM B - LOCATION CERTIFICATION

Name of Owner: Shieldalloy Metallurgical Corporation
Name of Facility: Shieldalloy Metallurgical Corporation
Location: 3419 North West Blvd, Vineland, Cumberland County, New Jersey
Case Number(s): NJDEP SRP PI#000297

LAND SURVEYOR'S CERTIFICATION

Well Permit Number: 35-00027314
(This number must be permanently affixed to the well casing.)

Owners Well Number (As shown on application or plans): SC32D

Geographic Coordinate NAD 83 (to nearest 1/10 of second):

Longitude: West 75°01'38.6" Latitude: North 39°31'36.0"

New Jersey State Plane Coordinates NAD 83 to nearest 10 feet:

North 252942.70 East 343372.30

Elevation of Top of Inner Casing (cap off) at
reference mark (nearest 0.01'): 90.41'

Source of elevation datum (benchmark, number/description and elevation/datum. If an on-site datum is used, identify here, assume datum of 100', and give approximated actual elevation.)

GPS observation [NAVD 1988]

Significant observations and notes: _____

AUTHENTICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment.

SEAL

Richard W. Clauser

PROFESSIONAL LAND SURVEYOR'S SIGNATURE

01/29/2010

DATE

RICHARD W. CLAUSER, PLS

GS16963

PROFESSIONAL LAND SURVEYOR'S NAME AND LICENSE NUMBER

(Please print or type)

TRC ENGINEERS INC.

16000 COMMERCE PARKWAY, MT. LAUREL, NJ 08054 (856) 273-1224

PROFESSIONAL LAND SURVEYOR'S ADDRESS AND PHONE NUMBER

MONITORING WELL CERTIFICATION FORM B - LOCATION CERTIFICATION

Name of Owner: Shieldalloy Metallurgical Corporation
Name of Facility: Shieldalloy Metallurgical Corporation
Location: 3419 North West Blvd, Vineland, Cumberland County, New Jersey
Case Number(s): NJDEP SRP PI#000297

LAND SURVEYOR'S CERTIFICATION

Well Permit Number: P200912475
(This number must be permanently affixed to the well casing.)

Owners Well Number (As shown on application or plans): SC33D

Geographic Coordinate NAD 83 (to nearest 1/10 of second):

Longitude: West 75°01'15.2" Latitude: North 39°31'59.2"

New Jersey State Plane Coordinates NAD 83 to nearest 10 feet:

North 255282.65 East 345212.72

Elevation of Top of Inner Casing (cap off) at
reference mark (nearest 0.01'): 106.87'

Source of elevation datum (benchmark, number/description and elevation/datum. If an on-site datum is used, identify here, assume datum of 100', and give approximated actual elevation.)

GPS observation [NAVD 1988]

Significant observations and notes: _____

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PROFESSIONAL LAND SURVEYOR'S ADDRESS AND PHONE NUMBER

MONITORING WELL CERTIFICATION FORM B - LOCATION CERTIFICATION

Name of Owner: Shieldalloy Metallurgical Corporation
Name of Facility: Shieldalloy Metallurgical Corporation
Location: 3419 North West Blvd, Vineland, Cumberland County, New Jersey
Case Number(s): NJDEP SRP PI#000297

LAND SURVEYOR'S CERTIFICATION

Well Permit Number: P200912473
(This number must be permanently affixed to the well casing.)

Owners Well Number (As shown on application or plans): SC34D

Geographic Coordinate NAD 83 (to nearest 1/10 of second):

Longitude: West 75°01'34.4" Latitude: North 39°32'05.9"

New Jersey State Plane Coordinates NAD 83 to nearest 10 feet:

North 255967.81 East 343718.98

Elevation of Top of Inner Casing (cap off) at
reference mark (nearest 0.01'): 102.61'

Source of elevation datum (benchmark, number/description and elevation/datum. If an on-site datum is used, identify here, assume datum of 100', and give approximated actual elevation.)

GPS observation [NAVD 1988]

Significant observations and notes: _____

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16000 COMMERCE PARKWAY, MT. LAUREL, NJ 08054 (856) 273-1224

PROFESSIONAL LAND SURVEYOR'S ADDRESS AND PHONE NUMBER

MONITORING WELL CERTIFICATION FORM B - LOCATION CERTIFICATION

Name of Owner: Shieldalloy Metallurgical Corporation
Name of Facility: Shieldalloy Metallurgical Corporation
Location: 3419 North West Blvd, Vineland, Cumberland County, New Jersey
Case Number(s): NJDEP SRP PI#000297

LAND SURVEYOR'S CERTIFICATION

Well Permit Number: P200913690
(This number must be permanently affixed to the well casing.)

Owners Well Number (As shown on application or plans): SC35D

Geographic Coordinate NAD 83 (to nearest 1/10 of second):

Longitude: West 75°03'24.7" Latitude: North 39°31'16.5"

New Jersey State Plane Coordinates NAD 83 to nearest 10 feet:

North 251028.32 East 335041.45

Elevation of Top of Inner Casing (cap off) at
reference mark (nearest 0.01'): 80.03'

Source of elevation datum (benchmark, number/description and elevation/datum. If an on-site datum is used, identify here, assume datum of 100', and give approximated actual elevation.)

GPS observation [NAVD 1988]

Significant observations and notes: _____

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16000 COMMERCE PARKWAY, MT. LAUREL, NJ 08054 (856) 273-1224

PROFESSIONAL LAND SURVEYOR'S ADDRESS AND PHONE NUMBER

MONITORING WELL CERTIFICATION FORM B - LOCATION CERTIFICATION

Name of Owner: Shieldalloy Metallurgical Corporation
Name of Facility: Shieldalloy Metallurgical Corporation
Location: 3419 North West Blvd, Vineland, Cumberland County, New Jersey
Case Number(s): NJDEP SRP PI#000297

LAND SURVEYOR'S CERTIFICATION

Well Permit Number: P200912476
(This number must be permanently affixed to the well casing.)

Owners Well Number (As shown on application or plans): SC36D

Geographic Coordinate NAD 83 (to nearest 1/10 of second):

Longitude: West 75°02'05.7" Latitude: North 39°32'30.6"

New Jersey State Plane Coordinates NAD 83 to nearest 10 feet:

North 258478.30 East 341275.42

Elevation of Top of Inner Casing (cap off) at
reference mark (nearest 0.01'): 90.59'

Source of elevation datum (benchmark, number/description and elevation/datum. If an on-site datum is used, identify here, assume datum of 100', and give approximated actual elevation.)

GPS observation [NAVD 1988]

Significant observations and notes: _____

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01/29/2010

DATE

RICHARD W. CLAUSER, PLS

GS16963

PROFESSIONAL LAND SURVEYOR'S NAME AND LICENSE NUMBER

(Please print or type)

TRC ENGINEERS INC.

16000 COMMERCE PARKWAY, MT. LAUREL, NJ 08054 (856) 273-1224

PROFESSIONAL LAND SURVEYOR'S ADDRESS AND PHONE NUMBER

MONITORING WELL RECORD

PROPERTY OWNER: DAN ORR

Company/Organization: Cumberland County Public Works

Address: 800 East Commerce Street Vineland City, New Jersey 08360

WELL LOCATION: Off Site North Vineland Car Wash Project

Address: W. Weymouth Road

County: Cumberland Municipality: Vineland City Lot: Right of Way Block: Right of Way

Easting (X): 344095 Northing (Y): 257426
Coordinate System: NJ State Plane (NAD83) - USFEET

DATE WELL STARTED: October 20, 2010

DATE WELL COMPLETED: October 20, 2010

WELL USE: MONITORING

Other Use(s): _____

Local ID: SC-37D (SC-37S)

WELL CONSTRUCTION

Total Depth Drilled (ft.): 25 Finished Well Depth (ft.): 25 Well Surface: Flush Mount

	Depth to Top (ft.)	Depth to Bottom (ft.)	Diameter (inches)	Material	Wgt/Rating/Screen # Used (lbs/ch no.)
Borehole	0	8	25		
Casing	0	20	2	PVC	40
Screen	20	25	2	PVC	.010

	Depth to Top (ft.)	Depth to Bottom (ft.)	Outer Diameter (in.)	Inner Diameter (in.)	Material		
					Bentonite (lbs.)	Neat Cement (lbs.)	Water (gal.)
Grout	0	15	8	2	20	376	32
Gravel Pack	15	25	8	2		0	

Grouting Method: Pressure method (Tremie Pipe)

Drilling Method: Hollow Stem Augers

ADDITIONAL INFORMATION

Protective Casing: Yes

Static Water Level: 6 ft. below land surface

Water Level Measure Tool: M-Scope

Well Development Period: 1 hrs.

Method of Development: Pump

Pump Type: _____

Pump Capacity: gpm

Total Design Head: ft.

Drilling Fluid: _____

Drill Rig: DT6610

Health and Safety Plan Submitted? Yes

ATTACHMENTS:

GEOLOGIC LOG

0 - 25: Orange Brown SW - Well-graded sands and gravelly sands, little or no fines

ADDITIONAL INFORMATION:

Driller of Record: Steven Moylan,
JOURNEYMAN LICENSE # 0022215

Company: EAST COAST DRILLING, INC.

MONITORING WELL CERTIFICATION - FORM A - AS-BUILT CERTIFICATION

(One form must be completed for each well)

Name of Permittee: Dan Orr
Name of Facility: Off Site North Vineland Car Wash Project
Location: W. Weymouth Road, Vineland City, Cumberland County, New Jersey 08360
NJDES Permit No: _____

CERTIFICATION

Well Permit Number (As assigned by NJDEP's Bureau of Water Allocation):	<u>E 2 0 1 0 1 3 0 6 1</u>
Owner's Well Number (As shown on the application or plans):	<u>SC-37D (SC-37S)</u>
Well Completion Date:	<u>10-20-10</u>
Distance from Top of Casing (cap off) to ground surface (One-hundredth of a foot):	<u>0.00</u>
Total Depth of Well to the nearest ½ foot:	<u>25.00</u>
Depth to Top of Screen From Top of Casing (or depth to open hole) To the nearest ½ foot:	<u>20.00</u>
Screen Length (pr length of open hole) in feet:	<u>5'</u>
Screen or Slot Size:	<u>.010</u>
Screen or Slot Material:	<u>Sch 40 PVC</u>
Casing Material: (PVC, Steel or Other-Specify):	<u>Sch 40 PVC</u>
Casing Diameter (inches):	<u>2"</u>
Static Water Level from Top of Casing at the Time of Installation (One-hundredth of a foot):	<u>6.00</u>
Yield (gallons per minutes):	<u>1.00</u>
Length of Time Well is Developed/Pumped or Bailed:	<u>1 Hours 00 Minutes</u>
Lithologic Log:	<u>Attach</u>

AUTHENTICATION

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James W. Duffy
Name (Type or Print)


Signature

M1224
Certification or License No.

Seal

Certification by Executive Officer or Duly Authorized Representative

Name (Type or Print)

Signature

Title

Date

MONITORING WELL RECORD

PROPERTY OWNER: DAVID GUIDARINI

Company/Organization: North Vineland Car Wash

Address: 130 W. Weymouth Road Vineland City, New Jersey 08360

WELL LOCATION: North Vineland Car Wash

Address: 130 W. Weymouth Road

County: Cumberland Municipality: Vineland City Lot: 33 Block: 501

Easting (X): 344227 Northing (Y): 257490
Coordinate System: NJ State Plane (NAD83) - USFEET

DATE WELL STARTED: October 19, 2010

DATE WELL COMPLETED: October 19, 2010

WELL USE: MONITORING

Other Use(s): _____

Local ID: SC-38D (SC-38I)

WELL CONSTRUCTION

Total Depth Drilled (ft.): 50 Finished Well Depth (ft.): 50 Well Surface: Flush Mount

	Depth to Top (ft.)	Depth to Bottom (ft.)	Diameter (inches)	Material	Wgt/Rating/Screen # Used (lbs/ch no.)
Borehole	0	50	8		
Casing	0	45	2	PVC	40
Screen	45	50	2	PVC	.010

	Depth to Top (ft.)	Depth to Bottom (ft.)	Outer Diameter (in.)	Inner Diameter (in.)	Material		
					Bentonite (lbs.)	Neat Cement (lbs.)	Water (gal.)
Grout	0	40	8	2	50	940	80
Gravel Pack	40	50	8	2		0	

Grouting Method: Pressure method (Tremie Pipe)

Drilling Method: Hollow Stem Augers

ADDITIONAL INFORMATION

Protective Casing: Yes

Static Water Level: 6 ft. below land surface

Water Level Measure Tool: M-Scope

Well Development Period: 1 hrs.

Method of Development: 1

Pump Type: _____

Pump Capacity: gpm

Total Design Head: ft.

Drilling Fluid: _____

Drill Rig: B-58

Health and Safety Plan Submitted? Yes

ATTACHMENTS:

GEOLOGIC LOG

0 - 50: Orange Brown SW - Well-graded sands and gravelly sands, little or no fines

ADDITIONAL INFORMATION:

Wellington Reeve,
Driller of Record: JOURNEYMAN LICENSE # 0001200

Company: EAST COAST DRILLING, INC.

MONITORING WELL CERTIFICATION - FORM A - AS-BUILT CERTIFICATION

(One form must be completed for each well)

Name of Permittee: David Guidarini
Name of Facility: North Vineland Car Wash
Location: 130 W. Weymouth Road, Vineland City, Cumberland County, New Jersey 08360
NJDES Permit No: _____

CERTIFICATION

Well Permit Number (As assigned by NJDEP's Bureau of Water Allocation):	<u>E 2 0 1 0 1 3 0 6 2</u>
Owner's Well Number (As shown on the application or plans):	<u>SC-38D (SC-38I)</u>
Well Completion Date:	<u>10-19-10</u>
Distance from Top of Casing (cap off) to ground surface (One-hundredth of a foot):	<u>0.00</u>
Total Depth of Well to the nearest 1/2 foot:	<u>50.00</u>
Depth to Top of Screen From Top of Casing (or depth to open hole) To the nearest 1/2 foot:	<u>45.00</u>
Screen Length (pr length of open hole) in feet:	<u>5'</u>
Screen or Slot Size:	<u>.010</u>
Screen or Slot Material:	<u>Sch 40 PVC</u>
Casing Material: (PVC, Steel or Other-Specify):	<u>Sch 40 PVC</u>
Casing Diameter (inches):	<u>2"</u>
Static Water Level from Top of Casing at the Time of Installation (One-hundredth of a foot):	<u>6.00</u>
Yield (gallons per minutes):	<u>1.00</u>
Length of Time Well is Developed/Pumped or Bailed:	<u>1 Hours 00 Minutes</u>
Lithologic Log:	<u>Attach</u>

AUTHENTICATION

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James W. Duffy
Name (Type or Print)


Signature

M1224
Certification or License No.

Seal

Certification by Executive Officer or Duly Authorized Representative

Name (Type or Print)

Signature

Title

Date

MONITORING WELL CERTIFICATION FORM B - LOCATION CERTIFICATION

Name of Owner: Dan Orr, Cumberland County
Name of Facility: Off Site North Vineland Car Wash Project
Location: W. Weymouth Road, Vineland City, Cumberland County, New Jersey 08360
Case Numbers: NJDEP SRP PI#000297 (UST #, ISRA #, Incident #, or EPA #)

LAND SURVEYOR'S CERTIFICATION

Well Permit Number E201013061
(This number must be permanently affixed to the well casing.)

Owners Well Number (As shown on application or plans): SC-37D (SC-37S)

Geographic Coordinate NAD 83 (to nearest 1/10 of second):

Longitude: West 75° 01' 29.7" Latitude: North 39° 32' 20.3"

New Jersey State Plane Coordinates NAD 83 to nearest 10 feet:

North 257426 East 344095

Elevation of Top of Inner Casing (cap off) at

Reference mark (nearest 0.01'): Top of PVC 90.46

Source of elevation datum (benchmark, number/description and elevation datum. If an alternate datum is used, identify here, assume datum of 100', and give approximated actual elevation.)

GPS observation (NAVD 88)

Significant observations and note: _____

AUTHENTICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that based on my inquiry of those individuals immediately responsible for obtaining the information. I believe the submitted information is true, accurate and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment.

SEAL



PROFESSIONAL LAND SURVEYOR'S SIGNATURE

11-15-10

DATE

Michael T. Armstrong

PROFESSIONAL LAND SURVEYOR'S NAME

(Please print or type)

GS35820

LICENSE NUMBER

TRC Engineers Inc., 322 Wall Street, Princeton, New Jersey, 08540

PROFESSIONAL LAND SURVEYOR'S ADDRESS AND PHONE NUMBER

(609) 497-1379

MONITORING WELL CERTIFICATION FORM B - LOCATION CERTIFICATION

Name of Owner: David Guidarini
Name of Facility: North Vineland Car Wash
Location: 130 W. Weymouth Road, Vineland City, Cumberland County, New Jersey 08360
Case Numbers: NJDEP SRP PI#000297 (UST #, ISRA #, Incident #, or EPA #)

LAND SURVEYOR'S CERTIFICATION

Well Permit Number E201013062
(This number must be permanently affixed to the well casing.)

Owners Well Number (As shown on application or plans): SC-38D (SC-38I)

Geographic Coordinate NAD 83 (to nearest 1/10 of second):

Longitude: West 75° 01' 28.0" Latitude: North 39° 32' 21.0"

New Jersey State Plane Coordinates NAD 83 to nearest 10 feet:

North 257490 East 344227

Elevation of Top of Inner Casing (cap off) at

Reference mark (nearest 0.01'): Top of PVC 90.86

Source of elevation datum (benchmark, number/description and elevation datum. If an alternate datum is used, identify here, assume datum of 100', and give approximated actual elevation.)

GPS observation (NAVD 88)

Significant observations and note: _____

AUTHENTICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that based on my inquiry of those individuals immediately responsible for obtaining the information. I believe the submitted information is true, accurate and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment.

SEAL


PROFESSIONAL LAND SURVEYOR'S SIGNATURE

Michael T. Armstrong
PROFESSIONAL LAND SURVEYOR'S NAME
(Please print or type)

11-15-10
DATE

GS35820
LICENSE NUMBER

TRC Engineers Inc., 322 Wall Street, Princeton, New Jersey, 08540 (609) 497-1379
PROFESSIONAL LAND SURVEYOR'S ADDRESS AND PHONE NUMBER

APPENDIX E

MONITORING WELL DEVELOPMENT LOGS VERTICAL PROFILE AND MONITORING WELL PURGE WQIP MEASUREMENTS

WELL DEVELOPMENT SUMMARY

SMC Off-Site Drilling Locations

Vineland, NJ

Well Number	Date	Method	Time	pH	Temperature (degrees C)	Conductivity (ms/m)	Turbidity (NTUs)	Notes
SC-33D	10/22/09	Submersible Pump	8:35					Start well development; too turbid to begin monitoring.
SC-33D	10/22/09	Submersible Pump	9:11	5.6	13.59	0.094	306.3	Surging submersible pump for the first half hour of development generated spikes of turbidity, so regular monitoring not yet started.
SC-33D	10/22/09	Submersible Pump	9:32	5.58	13.57	0.080	178.5	
SC-33D	10/22/09	Submersible Pump	9:42	5.28	13.6	0.096	355.3	Increase in turbidity due to surging.
SC-33D	10/22/09	Submersible Pump	9:50	5.21	13.59	0.092	172.1	Field parameters measured with a YSI 6920.
SC-33D	10/22/09	Submersible Pump	9:55	5.15	13.59	0.090	49.0	Approximately 170 gallons purged from well.
SC-33D	10/22/09	Submersible Pump	10:00	5.13	13.6	0.088	31.2	
SC-33D	10/22/09	Submersible Pump	10:05	5.12	13.61	0.088	26.1	

WELL DEVELOPMENT SUMMARY

SMC Off-Site Drilling Locations

Vineland, NJ

Well Number	Date	Method	Time	pH	Temperature (degrees C)	Conductivity (ms/m)	Turbidity (NTUs)	Notes
SC-34D	10/22/09	Submersible Pump	10:40					Start well development; too turbid to begin monitoring.
SC-34D	10/22/09	Submersible Pump	11:51				13.6	Surging submersible pump for the first hour of development generated spikes of turbidity, so regular monitoring not yet started.
SC-34D	10/22/09	Submersible Pump	12:00				11.5	Turbidity monitoring started when surging of pump produced significantly less turbid discharge.
SC-34D	10/22/09	Submersible Pump	12:10				10.99	Turbidity monitoring was accomplished using a Lamotte 2020 Tubidity Meter.
SC-34D	10/22/09	Submersible Pump	12:15				12.6	Approximately 160 gallons purged from well.
SC-34D	10/22/09	Submersible Pump	12:30				10.66	
SC-34D	10/22/09	Submersible Pump	12:40				8.61	

WELL DEVELOPMENT SUMMARY

SMC Off-Site Drilling Locations

Vineland, NJ

Well Number	Date	Method	Time	pH	Temperature (degrees C)	Conductivity (ms/m)	Turbidity (NTUs)	Notes
SC-35D	11/04/09	Submersible Pump	10:30					Start well development; too turbid to begin monitoring.
SC-35D	11/04/09	Submersible Pump	10:45				295	Cloudy, brown and silty
SC-35D	11/04/09	Submersible Pump	11:00				375	Cloudy, brown and silty
SC-35D	11/04/09	Submersible Pump	11:15				36.8	Cloudy, slightly brown and silty
SC-35D	11/04/09	Submersible Pump	11:30				33.1	Clear
SC-35D	11/04/09	Submersible Pump	11:45				6.5	Clear
SC-35D	11/04/09	Submersible Pump	12:00				4	Clear
								Total volume purged is approximately 115 gallons.

WELL DEVELOPMENT SUMMARY

SMC Off-Site Drilling Locations

Vineland, NJ

Well Number	Date	Method	Time	pH	Temperature (degrees C)	Conductivity (ms/m)	Turbidity (NTUs)	Notes
SC-36D	11/04/09	Submersible Pump	7:40					Star well development; too turbid to begin monitoring.
SC-36D	11/04/09	Submersible Pump	8:00				328	Cloudy, brown and silty
SC-36D	11/04/09	Submersible Pump	8:15				262	Cloudy, brown and silty
SC-36D	11/04/09	Submersible Pump	8:30				46.7	Cloudy, slightly brown and silty
SC-36D	11/04/09	Submersible Pump	8:45				44.2	Clearing, slightly silty
SC-36D	11/04/09	Submersible Pump	9:00				42	Clearing, slightly silty
SC-36D	11/04/09	Submersible Pump	9:15				94.5	Clearing, slightly silty
SC-36D	11/04/09	Submersible Pump	9:30				31.8	Clear
SC-36D	11/04/09	Submersible Pump	9:45				20.1	Clear
								Total volume purged is approximately 170 gallons.

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WELL NUMBER	WELL INFORMATION					Date: 10/5/2010
VP-16 (20-24)	Well Diameter	Total (1) Depth	Depth to Water TOC (ft)	Depth to Product TOC (ft)	PID (ppm)	TRC Personnel: David Marx, Brian Ross
PERMIT NUMBER	(inches)	(ft)				Site Name: SMC
						Site Location: Newfield, NJ
	NA	24.00	NA	NA	NA	TRC Job Number: 112434/2710ES

PURGING INFORMATION							TRC METER NUMBERS		
Pump Type	Tubing Type	Pump (2) Intake Depth (ft)	Purge Start Time	Purge Stop Time	Flow Rate (ml/min)	Total Purge Vol. (gal)	pH: --	Cond: --	DO: --
							Eh: --	Turbidity: --	NJDEP Cert. No. 07734
							Rental Meter Name: YSI-6820		
							Rental Meter Serial No.:		
Hyd. Lift	3/8" Teflon	24	10:05	10:22	420	1			

PURGING PARAMETERS (measurements are to be taken approximately every 5 minutes)										
Criteria:		<0.3 ft	+ 3%	+ 0.1 su	+ 3%	+ 10%	+ 10 mv	+ 10% ⁽³⁾		Water Conditions/Comments
Time	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (su)	Cond (mS/cm)	D.O. (mg/L)	ORP (mv)	Turbidity (NTU)		
10:05	NM	NA	16.76	6.83	0.717	2.05	-563.0	0.2	DM	Very silty, tan
10:10	NM	NA	16.91	7.18	0.728	0.13	-560.0	195.0	DM	Same as above
10:15	NM	NA	16.99	6.10	0.789	0.18	-525.0	1133.0	DM	Same as above, slightly less silty
Comments:										
Analytical Parameters: Hex Cr, Dissolved Hex Cr, Metals (Cr), Dissolved Metals (Cr), VOCs PPL 8260										Sample Start Time: 10:25 Sample Finish Time: 10:29
Weather Conditions: Low 50s, overcast, scattered showers										

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WELL NUMBER	WELL INFORMATION					Date: 10/5/2010
VP-16 (45-49)	Well Diameter	Total (1) Depth	Depth to Water TOC (ft)	Depth to Product TOC (ft)	PID (ppm)	TRC Personnel: David Marx, Brian Ross
PERMIT NUMBER	(inches)	(ft)				Site Name: SMC
						Site Location: Newfield, NJ
	NA	49.00	NA	NA	NA	TRC Job Number: 112434/2710ES

PURGING INFORMATION							TRC METER NUMBERS		
Pump Type	Tubing Type	Pump (2) Intake Depth (ft)	Purge Start Time	Purge Stop Time	Flow Rate (ml/min)	Total Purge Vol. (gal)	pH: --	Cond: --	DO: --
							Eh: --	Turbidity: --	NJDEP Cert. No. 07734
							Rental Meter Name:	YSI-6820	
Hyd. Lift	3/8" Teflon	49	9:25	9:45	475	2.5	Rental Meter Serial No.:		

PURGING PARAMETERS (measurements are to be taken approximately every 5 minutes)										
Criteria:		<0.3 ft	+ 3%	+ 0.1 su	+ 3%	+ 10%	+ 10 mv	+ 10% ⁽³⁾	Initials	Water Conditions/Comments
Time	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (su)	Cond (mS/cm)	D.O. (mg/L)	ORP (mv)	Turbidity (NTU)		
9:30	NM	NA	16.16	8.02	0.554	4.78	-324.0	213.0	DM	Very silty, tan
9:35	NM	NA	16.35	8.06	0.473	0.31	-630.0	75.1	DM	Same as above
9:40	NM	NA	16.65	7.99	0.669	0.23	-619.0	246.0	DM	Same as above, slightly less silty
9:45	NM	NA	16.56	7.11	0.592	0.27	-581.0	1130.0	DM	Same as above
Comments:										
Analytical Parameters: Hex Cr, Dissolved Hex Cr, Metals (Cr), Dissolved Metals (Cr), VOCs PPL 8260										Sample Start Time: 9:50 Sample Finish Time: 9:54
Weather Conditions: Low 50s, overcast, scattered showers										

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WELL NUMBER	WELL INFORMATION					Date:	10/5/2010
VP-16 (70-74)	Well Diameter	Total (1)	Depth to	Depth to	PID	TRC Personnel:	David Marx, Brian Ross
PERMIT NUMBER	(inches)	Depth	Water	Product	(ppm)	Site Name:	SMC
		(ft)	TOC (ft)	TOC (ft)		Site Location:	Newfield, NJ
	NA	74.00	NA	NA	NA	TRC Job Number:	112434/2710ES

PURGING INFORMATION							TRC METER NUMBERS		
Pump Type	Tubing Type	Pump (2)	Purge	Purge	Flow	Total	pH: --	Cond: --	DO: --
		Intake	Start	Stop	Rate	Purge	Eh: --	Turbidity: --	NJDEP Cert. No. 07734
		Depth (ft)	Time	Time	(ml/min)	Vol. (gal)	Rental Meter Name: YSI-6820		
Hyd. Lift	3/8" Teflon	74	8:10	8:50	425	4.5	Rental Meter Serial No.:		

PURGING PARAMETERS (measurements are to be taken approximately every 5 minutes)										
Criteria:		<0.3 ft	+ 3%	+ 0.1 su	+ 3%	+ 10%	+ 10 mv	+ 10% ⁽³⁾	Initials	Water Conditions/Comments
Time	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (su)	Cond (mS/cm)	D.O. (mg/L)	ORP (mv)	Turbidity (NTU)		
8:10	NM	NA	16.23	8.69	0.486	0.99	-665.0	18.7	DM	Very silty, tan
8:15	NM	NA	16.16	8.34	0.458	0.25	-629.0	1088.0	DM	Same as above
8:20	NM	NA	16.30	8.26	0.458	0.22	-599.0	1127.0	DM	Same as above
8:25	NM	NA	16.14	8.18	0.457	0.25	-478.0	1126.0	DM	Same as above
8:30	NM	NA	16.32	8.18	0.460	0.17	-486.0	1130.0	DM	Same as above
8:35	NM	NA	16.41	8.18	0.462	0.10	-573.0	1128.0	DM	Same as above
8:40	NM	NA	16.22	8.17	0.459	0.09	-555.0	1127.0	DM	Same as above
8:45	NM	NA	16.27	8.12	0.550	0.11	-583.0	1127.0	DM	Same as above
8:50	NM	NA	16.35	8.04	0.549	0.41	-410.0	1128.0	DM	Same as above, max purge volume
Comments:										
Analytical Parameters: Hex Cr, Dissolved Hex Cr, Metals (Cr), Dissolved Metals (Cr), VOCs PPL 8260										Sample Start Time: 8:51 Sample Finish Time: 8:55
Weather Conditions: Low 50s, overcast, scattered showers										

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WELL NUMBER	WELL INFORMATION					Date: 10/4/2010
VP-16 (95-99)	Well Diameter	Total (1) Depth	Depth to Water TOC (ft)	Depth to Product TOC (ft)	PID (ppm)	TRC Personnel: David Marx
PERMIT NUMBER	(inches)	(ft)				Site Name: SMC
						Site Location: Newfield, NJ
	NA	99.00	NA	NA	NA	TRC Job Number: 112434/2710ES

PURGING INFORMATION							TRC METER NUMBERS		
Pump Type	Tubing Type	Pump (2) Intake Depth (ft)	Purge Start Time	Purge Stop Time	Flow Rate (ml/min)	Total Purge Vol. (gal)	pH: --	Cond: --	DO: --
							Eh: --	Turbidity: --	NJDEP Cert. No. 07734
							Rental Meter Name: YSI-6820		
							Rental Meter Serial No.:		
Hyd. Lift	3/8" Teflon	99	14:20	15:25	300	4.75			

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WELL NUMBER	WELL INFORMATION					Date: 10/4/2010
VP-16 (120-124)	Well Diameter	Total (1) Depth	Depth to Water TOC (ft)	Depth to Product TOC (ft)	PID (ppm)	TRC Personnel: David Marx
PERMIT NUMBER	(inches)	(ft)				Site Name: SMC
						Site Location: Newfield, NJ
	NA	124.00	NA	NA	NA	TRC Job Number: 112434/2710ES

PURGING INFORMATION							TRC METER NUMBERS		
Pump Type	Tubing Type	Pump (2)	Purge	Purge	Flow	Total	pH:	Cond:	DO:
		Intake	Start	Stop	Rate	Purge	--	--	--
		Depth (ft)	Time	Time	(ml/min)	Vol. (gal)	Eh:	Turbidity:	NJDEP Cert. No.
							Rental Meter Name: YSI-6820		
							Rental Meter Serial No.:		
Hyd. Lift	3/8" Teflon	124	12:45	13:45	450	6.5			

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WELL NUMBER	WELL INFORMATION					Date: 10/7/2010
VP-17 (20-24)	Well Diameter	Total (1) Depth	Depth to Water TOC (ft)	Depth to Product TOC (ft)	PID (ppm)	TRC Personnel: Brian Ross
PERMIT NUMBER	(inches)	(ft)				Site Name: SMC
						Site Location: Newfield, NJ
	NA	24.00	NA	NA	NA	TRC Job Number: 112434/2710ES

PURGING INFORMATION							TRC METER NUMBERS		
Pump Type	Tubing Type	Pump (2) Intake Depth (ft)	Purge Start Time	Purge Stop Time	Flow Rate (ml/min)	Total Purge Vol. (gal)	pH: --	Cond: --	DO: --
							Eh: --	Turbidity: --	NJDEP Cert. No. 07734
							Rental Meter Name:	YSI-6820	
							Rental Meter Serial No.:		
Hyd. Lift	1/4" Teflon	24	15:44	16:25	285	3			

PURGING PARAMETERS (measurements are to be taken approximately every 5 minutes)										
Criteria:		<0.3 ft	+ 3%	+ 0.1 su	+ 3%	+ 10%	+ 10 mv	+ 10% ⁽³⁾		Water Conditions/Comments
Time	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (su)	Cond (mS/cm)	D.O. (mg/L)	ORP (mv)	Turbidity (NTU)		
15:50	NM	NA	20.05	6.24	0.119	0.11	-221.0	1224.5	BR	Brown, very turbid
15:55	NM	NA	21.26	6.14	0.112	0.16	-60.7	1235.6	BR	Same as above
16:00	NM	NA	21.91	6.07	0.113	0.06	-364.8	12.4	BR	Same as above
16:05	NM	NA	21.53	6.16	0.113	0.00	-395.8	1237.4	BR	Same as above
16:10	NM	NA	21.32	6.05	0.106	0.14	-188.4	1235.5	BR	Same as above, 2.25 gallons purged
16:15	NM	NA	21.52	5.90	0.096	0.50	-115.3	1237.5	BR	Same as above
16:20	NM	NA	21.62	5.81	0.091	0.77	-96.6	1238.3	BR	Samer as above
16:25	NM	NA	21.56	5.77	0.090	0.89	-75.8	7.5	BR	Same as above
Comments:										
Analytical Parameters: Hex Cr, Dissolved Hex Cr, Metals (Cr), Dissolved Metals (Cr), VOCs PPL 8260										Sample Start Time: 16:27 Sample Finish Time: 16:30
Weather Conditions: Low 70s, sunny										

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WELL NUMBER	WELL INFORMATION					Date:	10/7/2010
VP-17 (45-49)	Well Diameter	Total (1) Depth	Depth to Water TOC (ft)	Depth to Product TOC (ft)	PID (ppm)	TRC Personnel:	David Marx, Brian Ross
PERMIT NUMBER	(inches)	(ft)				Site Name:	SMC
						Site Location:	Newfield, NJ
	NA	49.00	NA	NA	NA	TRC Job Number:	112434/2710ES

PURGING INFORMATION							TRC METER NUMBERS		
Pump Type	Tubing Type	Pump (2) Intake Depth (ft)	Purge Start Time	Purge Stop Time	Flow Rate (ml/min)	Total Purge Vol. (gal)	pH: --	Cond: --	DO: --
							Eh: --	Turbidity: --	NJDEP Cert. No. 07734
							Rental Meter Name:	YSI-6820	
							Rental Meter Serial No.:		
Hyd. Lift	1/4" Teflon	49	14:57	15:25	755	6			

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WELL NUMBER	WELL INFORMATION					Date: 10/7/2010
VP-17 (70-74)	Well Diameter	Total (1) Depth	Depth to Water TOC (ft)	Depth to Product TOC (ft)	PID (ppm)	TRC Personnel: Brian Ross
PERMIT NUMBER	(inches)	(ft)				Site Name: SMC
						Site Location: Newfield, NJ
	NA	74.00	NA	NA	NA	TRC Job Number: 112434/2710ES

PURGING INFORMATION							TRC METER NUMBERS		
Pump Type	Tubing Type	Pump (2)	Purge	Purge	Flow	Total	pH: --	Cond: --	DO: --
		Intake	Start	Stop	Rate	Purge	Eh: --	Turbidity: --	NJDEP Cert. No. 07734
		Depth (ft)	Time	Time	(ml/min)	Vol. (gal)	Rental Meter Name: YSI-6820		
Hyd. Lift	1/4" Teflon	74	14:13	14:40	1060	7	Rental Meter Serial No.:		

PURGING PARAMETERS (measurements are to be taken approximately every 5 minutes)										
Criteria:		<0.3 ft	+ 3%	+ 0.1 su	+ 3%	+ 10%	+ 10 mv	+ 10% ⁽³⁾	Initials	Water Conditions/Comments
Time	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (su)	Cond (mS/cm)	D.O. (mg/L)	ORP (mv)	Turbidity (NTU)		
14:15	NM	NA	13.42	8.32	0.276	2.58	-537.3	5.6	BR	Brown, very turbid
14:20	NM	NA	NM	NM	NM	NM	NM	NM	BR	Same as above
14:25	NM	NA	17.57	7.48	0.265	3.28	-181.7	1201.1	BR	Same as above
14:30	NM	NA	17.52	7.47	0.263	4.68	-139.8	1200.8	BR	Same as above
14:35	NM	NA	17.48	7.46	0.263	5.11	-121.8	1200.5	BR	Same as above
14:40	NM	NA	17.56	7.47	0.234	5.59	-110.3	1201.1	BR	Same as above
Comments:										
Analytical Parameters: Hex Cr, Dissolved Hex Cr, Metals (Cr), Dissolved Metals (Cr), VOCs PPL 8260										Sample Start Time: 14:42
										Sample Finish Time: 14:46
Weather Conditions: Low 70s, sunny										

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WELL NUMBER	WELL INFORMATION					Date: 10/7/2010
VP-17 (95-99)	Well Diameter	Total (1) Depth	Depth to Water TOC (ft)	Depth to Product TOC (ft)	PID (ppm)	TRC Personnel: Brian Ross
PERMIT NUMBER	(inches)	(ft)				Site Name: SMC
						Site Location: Newfield, NJ
	NA	99.00	NA	NA	NA	TRC Job Number: 112434/2710ES

PURGING INFORMATION							TRC METER NUMBERS		
Pump Type	Tubing Type	Pump (2) Intake Depth (ft)	Purge Start Time	Purge Stop Time	Flow Rate (ml/min)	Total Purge Vol. (gal)	pH: --	Cond: --	DO: --
							Eh: --	Turbidity: --	NJDEP Cert. No. 07734
							Rental Meter Name:	YSI-6820	
							Rental Meter Serial No.:		
Hyd. Lift	3/8" Teflon	99	13:28	14:00	885	7			

PURGING PARAMETERS (measurements are to be taken approximately every 5 minutes)										
Criteria:		<0.3 ft	+ 3%	+ 0.1 su	+ 3%	+ 10%	+ 10 mv	+ 10% ⁽³⁾		Water Conditions/Comments
Time	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (su)	Cond (mS/cm)	D.O. (mg/L)	ORP (mv)	Turbidity (NTU)		
13:30	NM	NA	19.43	6.79	0.247	0.34	-553.1	230.1	BR	Dark brown, very turbid
13:35	NM	NA	18.59	7.87	0.287	0.60	-58.0	35.4	BR	Same as above
13:40	NM	NA	18.38	8.40	0.289	0.82	-292.7	512.1	BR	Reddish brown, very turbid
13:45	NM	NA	18.24	8.74	0.295	2.00	-257.6	1207.4	BR	Same as above
13:50	NM	NA	18.16	8.80	0.296	2.84	-228.0	1206.5	BR	Same as above, 5 gallons purged
13:55	NM	NA	18.12	8.84	0.297	3.54	-222.7	1206.3	BR	Same as above
14:00	NM	NA	18.06	8.86	0.297	3.90	-207.5	1205.6	BR	Same as above
Comments:										
Analytical Parameters: Hex Cr, Dissolved Hex Cr, Metals (Cr), Dissolved Metals (Cr), VOCs PPL 8260										Sample Start Time: 14:02 Sample Finish Time: 14:05
Weather Conditions: Low 70s, sunny										

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WELL NUMBER	WELL INFORMATION					Date: 10/7/2010
VP-17 (120-124)	Well Diameter	Total (1) Depth	Depth to Water TOC (ft)	Depth to Product TOC (ft)	PID (ppm)	TRC Personnel: Brian Ross
PERMIT NUMBER	(inches)	(ft)				Site Name: SMC
						Site Location: Newfield, NJ
	NA	124.00	NA	NA	NA	TRC Job Number: 112434/2710ES

PURGING INFORMATION							TRC METER NUMBERS		
Pump Type	Tubing Type	Pump (2) Intake Depth (ft)	Purge Start Time	Purge Stop Time	Flow Rate (ml/min)	Total Purge Vol. (gal)	pH: --	Cond: --	DO: --
							Eh: --	Turbidity: --	NJDEP Cert. No. 07734
							Rental Meter Name: YSI-6820		
							Rental Meter Serial No.:		
Hyd. Lift	1/4" Teflon	124	11:57	13:10	410	6			

PURGING PARAMETERS (measurements are to be taken approximately every 5 minutes)										
	Criteria:	<0.3 ft	+ 3%	+ 0.1 su	+ 3%	+ 10%	+ 10 mv	+ 10% ⁽³⁾		Water Conditions/Comments
Time	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (su)	Cond (mS/cm)	D.O. (mg/L)	ORP (mv)	Turbidity (NTU)		
12:15	NM	NA	21.72	7.43	0.267	0.61	-576.5	197.8	BR	Brown, very turbid
12:20	NM	NA	21.42	7.29	0.278	0.53	-586.2	1183.7	BR	Same as above
12:25	NM	NA	21.43	7.27	0.278	0.49	-580.0	1236.0	BR	Same as above
12:30	NM	NA	21.35	7.04	0.268	0.59	-567.1	1236.2	BR	Same as above
12:35	NM	NA	21.08	6.67	0.238	0.96	-248.8	1233.8	BR	Same as above
12:40	NM	NA	NM	NM	NM	NM	NM	NM	BR	Same as above
12:45	NM	NA	20.67	5.65	0.233	1.36	-106.9	1230.4	BR	Same as above
12:50	NM	NA	NM	NM	NM	NM	NM	NM	BR	Same as above
12:55	NM	NA	20.53	5.52	0.233	1.57	-61.0	1227.8	BR	Same as above, 4.5 gallons purged
13:00	NM	NA	20.54	5.40	0.233	1.78	-43.7	1228.5	BR	Same as above
13:05	NM	NA	20.51	5.64	0.233	1.92	-27.60	1000.70	BR	Same as above
13:10	NM	NA	20.45	5.53	0.232	2.10	-22.30	284.30	BR	Same as above
Comments:										
Analytical Parameters: Hex Cr, Dissolved Hex Cr, Metals (Cr), Dissolved Metals (Cr), VOCs PPL 8260										Sample Start Time: 13:12 Sample Finish Time: 13:16
Weather Conditions: Low 70s, sunny										

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WELL NUMBER	WELL INFORMATION					Date: 10/6/2010
VP-18 (20-24)	Well Diameter	Total (1) Depth	Depth to Water TOC (ft)	Depth to Product TOC (ft)	PID (ppm)	TRC Personnel: Brian Ross
PERMIT NUMBER	(inches)	(ft)				Site Name: SMC
						Site Location: Newfield, NJ
	NA	24.00	NA	NA	NA	TRC Job Number: 112434/2710ES

PURGING INFORMATION							TRC METER NUMBERS		
Pump Type	Tubing Type	Pump (2) Intake Depth (ft)	Purge Start Time	Purge Stop Time	Flow Rate (ml/min)	Total Purge Vol. (gal)	pH: --	Cond: --	DO: --
							Eh: --	Turbidity: --	NJDEP Cert. No. 07734
							Rental Meter Name:	YSI-6820	
Hyd. Lift	1/4" Teflon	24	14:53	15:20	280	2	Rental Meter Serial No.:		

PURGING PARAMETERS (measurements are to be taken approximately every 5 minutes)										
	Criteria:	<0.3 ft	+ 3%	+ 0.1 su	+ 3%	+ 10%	+ 10 mv	+ 10%⁽³⁾	Initials	Water Conditions/Comments
Time	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (su)	Cond (mS/cm)	D.O. (mg/L)	ORP (mv)	Turbidity (NTU)		
15:00	NM	NA	19.79	6.81	0.309	4.76	-430.0	435.0	BR	Brown, very turbid
15:05	NM	NA	19.48	6.66	0.159	0.71	-570.0	370.3	BR	Same as above, 1 gallon purged
15:10	NM	NA	20.19	6.72	0.167	0.44	-577.8	567.5	BR	Same as above
15:15	NM	NA	20.14	6.56	0.145	0.31	-542.8	1224.6	BR	Same as above
15:20	NM	NA	NM	6.43	0.132	0.87	-369.8	1223.0	BR	Same as above
Comments:										
Analytical Parameters: Hex Cr, Dissolved Hex Cr, Metals (Cr), Dissolved Metals (Cr), VOCs PPL 8260										Sample Start Time: 15:22 Sample Finish Time: 15:25
Weather Conditions: Low 60s, sunny										

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WELL NUMBER	WELL INFORMATION					Date: 10/6/2010
VP-18 (45-49)	Well Diameter	Total (1) Depth	Depth to Water TOC (ft)	Depth to Product TOC (ft)	PID (ppm)	TRC Personnel: Brian Ross
PERMIT NUMBER	(inches)	(ft)				Site Name: SMC
						Site Location: Newfield, NJ
	NA	49.00	NA	NA	NA	TRC Job Number: 112434/2710ES

PURGING INFORMATION							TRC METER NUMBERS		
Pump Type	Tubing Type	Pump (2) Intake Depth (ft)	Purge Start Time	Purge Stop Time	Flow Rate (ml/min)	Total Purge Vol. (gal)	pH: --	Cond: --	DO: --
							Eh: --	Turbidity: --	NJDEP Cert. No. 07734
							Rental Meter Name: YSI-6820		
							Rental Meter Serial No.:		
Hyd. Lift	1/4" Teflon	49	14:05	14:30	455	3			

PURGING PARAMETERS (measurements are to be taken approximately every 5 minutes)										
Criteria:		<0.3 ft	+ 3%	+ 0.1 su	+ 3%	+ 10%	+ 10 mv	+ 10% ⁽³⁾		Water Conditions/Comments
Time	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (su)	Cond (mS/cm)	D.O. (mg/L)	ORP (mv)	Turbidity (NTU)		
14:15	NM	NA	18.47	6.94	0.313	1.17	-550.3	1030.1	BR	Brown, very turbid
14:20	NM	NA	18.49	6.85	0.315	0.73	-352.3	1210.0	BR	Same as above
14:25	NM	NA	18.63	6.78	0.315	0.94	-256.0	1211.0	BR	Same as above
14:30	NM	NA	1831.00	6.70	0.313	1.66	-194.2	1208.0	BR	Same as above
Comments:										
Analytical Parameters: Hex Cr, Dissolved Hex Cr, Metals (Cr), Dissolved Metals (Cr), VOCs PPL 8260										Sample Start Time: 14:32 Sample Finish Time: 14:36
Weather Conditions: Low 60s, sunny										

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WELL NUMBER	WELL INFORMATION					Date: 10/6/2010
VP-18 (70-74)	Well Diameter	Total (1) Depth	Depth to Water TOC (ft)	Depth to Product TOC (ft)	PID (ppm)	TRC Personnel: Brian Ross
PERMIT NUMBER	(inches)	(ft)				Site Name: SMC
						Site Location: Newfield, NJ
	NA	74.00	NA	NA	NA	TRC Job Number: 112434/2710ES

PURGING INFORMATION							TRC METER NUMBERS		
Pump Type	Tubing Type	Pump (2) Intake Depth (ft)	Purge Start Time	Purge Stop Time	Flow Rate (ml/min)	Total Purge Vol. (gal)	pH: --	Cond: --	DO: --
							Eh: --	Turbidity: --	NJDEP Cert. No. 07734
							Rental Meter Name: YSI-6820		
							Rental Meter Serial No.:		
Hyd. Lift	3/8" Teflon	74	12:57	13:45	420	5			

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WELL NUMBER	WELL INFORMATION					Date: 10/6/2010
VP-18 (95-99)	Well Diameter	Total (1) Depth	Depth to Water TOC (ft)	Depth to Product TOC (ft)	PID (ppm)	TRC Personnel: Brian Ross
PERMIT NUMBER	(inches)	(ft)				Site Name: SMC
						Site Location: Newfield, NJ
	NA	99.00	NA	NA	NA	TRC Job Number: 112434/2710ES

PURGING INFORMATION							TRC METER NUMBERS		
Pump Type	Tubing Type	Pump (2) Intake Depth (ft)	Purge Start Time	Purge Stop Time	Flow Rate (ml/min)	Total Purge Vol. (gal)	pH: --	Cond: --	DO: --
							Eh: --	Turbidity: --	NJDEP Cert. No. 07734
							Rental Meter Name:	YSI-6820	
Hyd. Lift	3/8" Teflon	99	11:40	12:35	530	7	Rental Meter Serial No.:		

PURGING PARAMETERS (measurements are to be taken approximately every 5 minutes)										
Criteria:		<0.3 ft	+ 3%	+ 0.1 su	+ 3%	+ 10%	+ 10 mv	+ 10% ⁽³⁾	Initials	Water Conditions/Comments
Time	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (su)	Cond (mS/cm)	D.O. (mg/L)	ORP (mv)	Turbidity (NTU)		
11:45	NM	NA	18.24	8.69	0.257	2.04	-317.2	1097.4	BR	Brown, very silty
11:50	NM	NA	NM	NM	NM	NM	NM	NM	BR	
11:55	NM	NA	17.92	9.56	0.293	4.47	-207.7	1204.7	BR	Same as above
12:00	NM	NA	17.87	9.49	0.304	5.26	-194.7	1204.4	BR	Same as above
12:05	NM	NA	17.82	9.50	0.309	5.64	-195.7	1204.2	BR	Same as above
12:10	NM	NA	17.95	9.56	0.311	5.75	-197.6	1204.9	BR	Same as above
12:15	NM	NA	17.80	9.51	0.313	5.88	-200.4	1203.8	BR	Same as above, 4.5 gallons purged
12:20	NM	NA	17.74	9.58	0.314	5.96	-201.4	801.7	BR	Same as above
12:25	NM	NA	17.72	9.77	0.315	6.05	-202.5	1203.2	BR	Same as above
12:30	NM	NA	17.77	9.82	0.316	6.08	-203.0	1203.7	BR	Same as above
12:35	NM	NA	17.68	9.71	0.317	6.16	-202.6	1202.6	BR	Same as above
Comments:										
Analytical Parameters: Hex Cr, Dissolved Hex Cr, Metals (Cr), Dissolved Metals (Cr), VOCs PPL 8260										Sample Start Time: 12:37 Sample Finish Time: 12:40
Weather Conditions: Low 60s, sunny										

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WELL NUMBER	WELL INFORMATION					Date: 10/6/2010
VP-18 (120-121)	Well Diameter	Total (1) Depth	Depth to Water TOC (ft)	Depth to Product TOC (ft)	PID (ppm)	TRC Personnel: Brian Ross
PERMIT NUMBER	(inches)	(ft)				Site Name: SMC
						Site Location: Newfield, NJ
	NA	121.00	NA	NA	NA	TRC Job Number: 112434/2710ES

PURGING INFORMATION							TRC METER NUMBERS		
Pump Type	Tubing Type	Pump (2) Intake Depth (ft)	Purge Start Time	Purge Stop Time	Flow Rate (ml/min)	Total Purge Vol. (gal)	pH: --	Cond: --	DO: --
							Eh: --	Turbidity: --	NJDEP Cert. No. 07734
							Rental Meter Name: YSI-6820		
							Rental Meter Serial No.:		
Hyd. Lift	1/4" Teflon	121	10:05	11:20	465	8			

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WELL NUMBER	WELL INFORMATION					Date: 10/8/2010
VP-19 (20-24)	Well Diameter	Total (1) Depth	Depth to Water TOC (ft)	Depth to Product TOC (ft)	PID (ppm)	TRC Personnel: Brian Ross
PERMIT NUMBER	(inches)	(ft)				Site Name: SMC
						Site Location: Newfield, NJ
	NA	24.00	NA	NA	NA	TRC Job Number: 112434/2710ES

PURGING INFORMATION							TRC METER NUMBERS		
Pump Type	Tubing Type	Pump (2) Intake Depth (ft)	Purge Start Time	Purge Stop Time	Flow Rate (ml/min)	Total Purge Vol. (gal)	pH: --	Cond: --	DO: --
							Eh: --	Turbidity: --	NJDEP Cert. No. 07734
							Rental Meter Name: YSI-6820		
							Rental Meter Serial No.:		
Hyd. Lift	3/8" Teflon	24	12:56	13:30	500	4.5			

PURGING PARAMETERS (measurements are to be taken approximately every 5 minutes)										
Criteria:		<0.3 ft	+ 3%	+ 0.1 su	+ 3%	+ 10%	+ 10 mv	+ 10% ⁽³⁾	Initials	Water Conditions/Comments
Time	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (su)	Cond (mS/cm)	D.O. (mg/L)	ORP (mv)	Turbidity (NTU)		
13:00	NM	NA	17.70	6.27	0.164	0.36	-480.2	420.4	BR	Light brown, very turbid
13:05	NM	NA	17.50	5.97	0.111	0.13	-134.5	1200.2	BR	Same as above
13:10	NM	NA	17.33	5.76	0.100	0.23	-81.3	1199.0	BR	Same as above
13:15	NM	NA	17.48	5.62	0.093	0.23	-33.0	1199.6	BR	Same as above
13:20	NM	NA	17.39	5.54	0.090	0.21	-8.8	1199.4	BR	Same as above
13:25	NM	NA	17.36	5.46	0.086	0.18	12.6	1199.6	BR	Same as above
13:30	NM	NA	17.45	5.41	0.084	0.17	29.9	453.7	BR	Same as above
Comments:										
Analytical Parameters: Hex Cr, Dissolved Hex Cr, Metals (Cr), Dissolved Metals (Cr), VOCs PPL 8260										Sample Start Time: 13:32
										Sample Finish Time: 13:35
Weather Conditions: Mid 70s, sunny										

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WELL NUMBER	WELL INFORMATION					Date: 10/8/2010
VP-19 (45-49)	Well Diameter	Total (1) Depth	Depth to Water TOC (ft)	Depth to Product TOC (ft)	PID (ppm)	TRC Personnel: Brian Ross
PERMIT NUMBER	(inches)	(ft)				Site Name: SMC
						Site Location: Newfield, NJ
	NA	49.00	NA	NA	NA	TRC Job Number: 112434/2710ES

PURGING INFORMATION							TRC METER NUMBERS		
Pump Type	Tubing Type	Pump (2) Intake Depth (ft)	Purge Start Time	Purge Stop Time	Flow Rate (ml/min)	Total Purge Vol. (gal)	pH: --	Cond: --	DO: --
							Eh: --	Turbidity: --	NJDEP Cert. No. 07734
							Rental Meter Name: YSI-6820		
							Rental Meter Serial No.:		
Hyd. Lift	3/8" Teflon	49	12:12	12:40	810	6			

PURGING PARAMETERS (measurements are to be taken approximately every 5 minutes)										
Criteria:		<0.3 ft	+ 3%	+ 0.1 su	+ 3%	+ 10%	+ 10 mv	+ 10% ⁽³⁾		Water Conditions/Comments
Time	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (su)	Cond (mS/cm)	D.O. (mg/L)	ORP (mv)	Turbidity (NTU)		
12:15	NM	NA	18.52	7.92	0.296	4.30	-14.6	1204.9	BR	Brown/orange, very turbid
12:20	NM	NA	17.10	6.85	0.301	0.54	-460.6	450.3	BR	Brown, very turbid
12:25	NM	NA	16.84	6.59	0.292	0.41	-474.6	1194.4	BR	Same as above
12:30	NM	NA	16.72	6.47	0.290	0.28	-472.6	1193.6	BR	Same as above
12:35	NM	NA	16.70	6.41	0.289	0.13	-358.6	32.7	BR	Same as above, 5 gallons purged
12:40	NM	NA	16.76	6.39	0.288	0.16	-427.4	1193.5	BR	Same as above
Comments:										
Analytical Parameters: Hex Cr, Dissolved Hex Cr, Metals (Cr), Dissolved Metals (Cr), VOCs PPL 8260										Sample Start Time: 12:42 Sample Finish Time: 12:46
Weather Conditions: Mid 70s, sunny										

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WELL NUMBER	WELL INFORMATION					Date: 10/8/2010
VP-19 (70-74)	Well Diameter	Total (1) Depth	Depth to Water TOC (ft)	Depth to Product TOC (ft)	PID (ppm)	TRC Personnel: Brian Ross
PERMIT NUMBER	(inches)	(ft)				Site Name: SMC
						Site Location: Newfield, NJ
	NA	74.00	NA	NA	NA	TRC Job Number: 112434/2710ES

PURGING INFORMATION							TRC METER NUMBERS		
Pump Type	Tubing Type	Pump (2) Intake Depth (ft)	Purge Start Time	Purge Stop Time	Flow Rate (ml/min)	Total Purge Vol. (gal)	pH: --	Cond: --	DO: --
							Eh: --	Turbidity: --	NJDEP Cert. No. 07734
							Rental Meter Name: YSI-6820		
							Rental Meter Serial No.:		
Hyd. Lift	3/8" Teflon	74	11:26	12:00	880	7			

PURGING PARAMETERS (measurements are to be taken approximately every 5 minutes)										
Criteria:		<0.3 ft	+ 3%	+ 0.1 su	+ 3%	+ 10%	+ 10 mv	+ 10% ⁽³⁾	Initials	Water Conditions/Comments
Time	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (su)	Cond (mS/cm)	D.O. (mg/L)	ORP (mv)	Turbidity (NTU)		
11:30	NM	NA	17.47	6.78	0.256	1.56	-28.5	139.5	BR	Brown, very turbid
11:35	NM	NA	16.52	7.76	0.289	1.04	-222.2	547.9	BR	Same as above
11:40	NM	NA	16.40	7.93	0.291	1.93	-137.6	1190.8	BR	Same as above, 3.5 gallons purged
11:45	NM	NA	16.39	7.96	0.291	2.10	-122.6	1190.6	BR	Same as above
11:50	NM	NA	16.31	7.94	0.292	2.36	-107.3	406.1	BR	Same as above
11:55	NM	NA	16.37	7.94	0.292	2.85	-96.4	1191.0	BR	Same as above
12:00	NM	NA	16.36	7.94	0.291	2.73	-89.4	1190.1	BR	Same as above
Comments:										
Analytical Parameters: Hex Cr, Dissolved Hex Cr, Metals (Cr), Dissolved Metals (Cr), VOCs PPL 8260										Sample Start Time: 12:02
										Sample Finish Time: 12:06
Weather Conditions: Mid 70s, sunny										

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WELL NUMBER	WELL INFORMATION					Date: 10/8/2010
VP-19 (95-99)	Well Diameter	Total (1) Depth	Depth to Water TOC (ft)	Depth to Product TOC (ft)	PID (ppm)	TRC Personnel: Brian Ross
PERMIT NUMBER	(inches)	(ft)				Site Name: SMC
						Site Location: Newfield, NJ
	NA	99.00	NA	NA	NA	TRC Job Number: 112434/2710ES

PURGING INFORMATION							TRC METER NUMBERS		
Pump Type	Tubing Type	Pump (2) Intake Depth (ft)	Purge Start Time	Purge Stop Time	Flow Rate (ml/min)	Total Purge Vol. (gal)	pH: --	Cond: --	DO: --
							Eh: --	Turbidity: --	NJDEP Cert. No. 07734
							Rental Meter Name:	YSI-6820	
Hyd. Lift	3/8" Teflon	99	10:42	11:15	920	8	Rental Meter Serial No.:		

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WELL NUMBER	WELL INFORMATION					Date: 10/8/2010
VP-19 (120-124)	Well Diameter	Total (1) Depth	Depth to Water TOC (ft)	Depth to Product TOC (ft)	PID (ppm)	TRC Personnel: Brian Ross
PERMIT NUMBER	(inches)	(ft)				Site Name: SMC
						Site Location: Newfield, NJ
	NA	124.00	NA	NA	NA	TRC Job Number: 112434/2710ES

PURGING INFORMATION							TRC METER NUMBERS		
Pump Type	Tubing Type	Pump (2) Intake Depth (ft)	Purge Start Time	Purge Stop Time	Flow Rate (ml/min)	Total Purge Vol. (gal)	pH: --	Cond: --	DO: --
							Eh: --	Turbidity: --	NJDEP Cert. No. 07734
							Rental Meter Name:	YSI-6820	
Hyd. Lift	3/8" Teflon	124	9:51	10:20	1500	10	Rental Meter Serial No.:		

PURGING PARAMETERS (measurements are to be taken approximately every 5 minutes)										
Criteria:		<0.3 ft	+ 3%	+ 0.1 su	+ 3%	+ 10%	+ 10 mv	+ 10%⁽³⁾	Initials	Water Conditions/Comments
Time	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (su)	Cond (mS/cm)	D.O. (mg/L)	ORP (mv)	Turbidity (NTU)		
9:55	NM	NA	16.28	7.03	0.254	0.42	-344.2	972.8	BR	Brown, very turbid
10:00	NM	NA	NM	NM	NM	NM	NM	NM	BR	Teflon tubing bending. Fixed
10:05	NM	NA	15.89	6.06	0.248	0.26	-176.9	1186.9	BR	Brown, very turbid
10:10	NM	NA	13.84	5.97	0.247	0.25	-173.0	1186.1	BR	Same as above
10:15	NM	NA	15.81	6.02	0.246	0.25	-179.5	1185.6	BR	Same as above
10:20	NM	NA	15.80	5.96	0.227	0.28	-152.8	1185.5	BR	Same as above, 10 gallons purged
Comments:										
Analytical Parameters: Hex Cr, Dissolved Hex Cr, Metals (Cr), Dissolved Metals (Cr), VOCs PPL 8260										Sample Start Time: 10:22 Sample Finish Time: 10:26
Weather Conditions: Mid 70s, sunny										

Revised 01/05

Revised 01/05

H:\HAZMAT\SMC\Newfield\2009 Phase II Offsite Investigation\Draft P2 Report with PJ Comments (3-2010)\Car Wash Area Investigation\GWSM - Vertical Profiling Purge Forms.xlsx

Field Form - Regular Purging

Sheet 1 of 1

Date: 10/5/2010 TRC Personnel: D. Marx Weather: Mid 50s, scattered showers

Site Name/Location: SMC , Newfield, NJ revised 07/09

PRE-PURGE INFORMATION									
Well No. or Name	Time	Total Depth (ft)	Depth To Water (ft)	Water Column (ft)	Multi-plier	Est. Purge Vol.(gal)	PID (ppm)	Depth to Prod. (ft)	Prod. Thick. (ft)
DS	08:00	16.10	5.75	10.35	0.123	1.3	NM	NM	NM
DD	08:07	25.90	5.79	20.15	0.123	2.5	NM	NM	NM
AS	08:20	17.60	6.56	11.04	0.123	1.4	NM	NM	NM
AD	08:24	25.70	6.43	19.27	0.123	2.4	NM	NM	NM

PRE-PURGE						
Temp (°C)	pH (su)	Field Cond (uS/cm)	Sal. (ppt)	ORP (mV)	D.O. (ppm)	ini.
18.59	6.13	164	NM	200	6.96	DM
18.01	6.42	96	NM	182	3.08	DM
20.43	5.79	136	NM	208	3.53	DM
19.85	6.19	162	NM	157	6.46	DM

PURGING INFORMATION								
Well No. or Name	Pump Intake Depth (ft)	Time Pump On	Time Pump Off	Purge Rate (gpm)	Post-Purge DTW (ft)	Total Purge Vol. (gal)	Pump Type	Water Conditions (During Purging)
DS	7	14:55	15:00		6.53	1.5	Peristaltic	Clear
DD	7	14:20	14:24		6.41	2.5	Peristaltic	Clear
AS	8	13:40	13:42		5.62	1.5	Peristaltic	Silty
AD	8	13:00	13:10		5.67	2.5	Peristaltic	Slightly silty at end

POST-PURGE						
Temp (°C)	pH (su)	Field Cond (uS/cm)	Sal. (ppt)	ORP (mV)	D.O. (ppm)	ini.
18.58	6.31	212	NM	199	5.10	DM
17.57	5.41	219	NM	216	4.45	DM
19.39	5.78	145	MN	210	3.99	DM
18.66	5.55	183	NM	200	2.49	DM

SAMPLING INFORMATION					
Well No. or Name	80% Recov. (ft)	Depth To Water (ft)	Sample Time	Sample Method*	Comments/Water Condition at Time of Sample
DS	7.82	6.56	15:10	Bailer	Clear
DD	9.82	6.43	14:40	Bailer	Clear
AS	8.77	5.75	13:44	Bailer	Silty
AD	10.28	5.79	13:17	Bailer	Silty

POST-SAMPLE						
Temp (°C)	pH (su)	Field Cond (uS/cm)	Sal. (ppt)	ORP (mV)	D.O. (ppm)	ini.
18.31	6.28	220	NM	204	5.22	DM
17.31	5.11	224	NM	234	4.56	DM
19.50	5.79	164	NM	222	3.87	DM
16.63	5.49	188	NM	219	1.76	DM

Total depth includes stick-up height.

Multiplier includes a factor of 3 to calculate the required volume of ground water to be removed from the well.

80% recovery is calculated by subtracting 80% of the water column height from the total depth [Total Depth - (0.80 x Water Column)].

PID lamp is 10.6 eV, unless otherwise noted.

*Sample method: bailer, submersible pump, peristaltic, etc.

NJDEP Certification No. 07734

TRC Meter Numbers				Rental Meter	
pH: --	Cond: --	D.O.: --		Name: YSI-6920	
ORP: --				Serial No.: 1595	

TRC Job No.	2710ES/112434
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Table
Ground Water Sampling Measurements and Calculations

SAMPLING DATE: 11/04/2010

Weather: Low 50's, very rainy

Site Name/Location: SMC, Newfield, NJ

revised: 08/10

PRE-PURGE INFORMATION									
Well No. or Name	Time	Total Depth (ft)	Depth To Water (ft)	Water Column (ft)	Multi-plier	Est. Purge Vol.(gal)	PID (ppm)	Depth to Prod. (ft)	Prod. Thick. (ft)
SC-38I	10:15	50.00	5.41	44.59	0.49	21.9	ND	ND	ND
SC-37S	11:34	25.00	4.92	20.08	0.49	9.9	ND	ND	ND

PRE-PURGE					
Temp (°C)	pH (su)	K ₂₅ (mS/cm)	Turb. (NT)	ORP (mV)	D.O. (ppm)
18.74	6.37	0.17	9	178.6	3.72
13.94	5.90	0.12	135.5	211.3	5.76

PURGING INFORMATION								
Well No. or Name	Pump Intake Depth (ft)	Time Pump On	Time Pump Off	Purge Rate (gpm)	Post-Purge DTW (ft)	Total Purge Vol. (gal)	Pump Type	Water Conditions (During Purging)
SC-38I	47	10:20	10:43	<1	5.39	22	Grunfos	Clear
SC-37S	22	11:28	11:43	<1	4.84	15	Grunfos	Clear

POST-PURGE					
Temp (°C)	pH (su)	K ₂₅ (mS/cm)	Turb. (NT)	ORP (mV)	D.O. (ppm)
15.42	5.96	0.25	2	183.8	0.83
17.23	5.88	0.12	9.7	208	4.75

SAMPLING INFORMATION					
Well No. or Name	80% Recov. (ft)	Depth To Water (ft)	Sample Time	Sample Method*	Comments/Water Condition at Time of Sample
SC-38I	14.33	5.80	12:20	Bailer	Clear
SC-37S	8.94	5.84	12:35	Bailer	Clear

POST-SAMPLE					
Temp (°C)	pH (su)	K ₂₅ (mS/cm)	Turb. (NT)	ORP (mV)	D.O. (ppm)
18.53	7.28	0.19	34	171.1	4.96
16.77	5.92	0.12	9.6	202.9	5.61

Total depth includes stick-up height, if applicable.

Multiplier includes a factor of 3 to calculate the required volume of ground water to be removed from the well.

ND=Not Determined

80% recovery is calculated by subtracting 80% of the water column height from the total depth [Total Depth - (0.80 x Water Column)].

PID lamp is 10.6 eV, unless otherwise noted.

Analytical Methods (EPA): Temp (170.1); pH (150.1); Cond (120.1); DO (360.1); ; Salinity (SM 2520B)

K₂₅ = conductivity corrected to 25°C.

*Sample method: bailer, submersible pump, peristaltic, etc.

Reviewed & Approved by: _____
Laboratory Manager or Designated Supervisor

TRC Meter Numbers			Rental Meter	
pH: _____	Cond: _____	D.O.: _____	Name: SONDE 6920	
ORP: _____			Serial #: 06820	

NJDEP Certification No. 07734

APPENDIX F

HAZSITE LABORATORY RESULTS (DISKETTE ONLY IN NJDEP COPIES)